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Plan Purpose and Authority

The Disaster Mitigation Act of 2000 (DMA2K), commonly known as the 2000 Stafford Act Amendments, was approved by Congress on October 10, 2000. Section 322 is the DMA2K amendment[16] to the Stafford Act that primarily deals with hazard mitigation planning as it relates to the development of local hazard mitigation plans. The DMA2K legislation was signed into law by the President on October 30, 2000 (Public Law 106-390). The Interim Final Rule for planning provisions (implemented at 44 CFR Part 201) was initially published in the Federal Register on February 26, 2002. The Interim Final Rule was again published on October 1, 2002 to extend the planning deadline to November 1, 2004. Hazard mitigation planning requirements for tribes wishing to participate as grantees under the public assistance and hazard mitigation programs are essentially the same as those of a state, and are implemented in the Interim Final Rule at 44 CFR Part 201.4.

The overall purpose of DMA2K was to amend the Stafford Act in order to establish a national program for pre-disaster mitigation, streamline administration of disaster relief at both the federal and state levels, and control federal costs of disaster assistance. Congress envisioned that implementation of these new requirements would result in the following key benefits:

- Reduction of loss of life and property, human suffering, economic disruption, and disaster costs.
- Prioritization of hazard mitigation planning at the local level, with an increased emphasis placed on planning and public involvement, assessing risks, implementing loss reduction measures, and ensuring critical services/facilities survive a disaster.
- Establishment of economic incentives, awareness and education via federal support to state, tribal, and local governments, that will result in forming community-based partnerships, implementing effective hazard mitigation measures, leveraging additional non-Federal resources, and establishing commitments to long-term hazard mitigation efforts.

In general, the DMA2K legislation requires all local, county, and tribal governments to develop a hazard mitigation plan for their respective community in order to be eligible to receive certain federal mitigation funds including Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Program (PDM) funds. Preparation of this plan will also satisfy the requirements of the Flood Mitigation Assistance Program (FMA) as well.

In addition to satisfying the regulatory requirements of DMA2K, the primary purpose of this plan is to identify natural and human-caused hazards that impact the Kaibab Band of Paiute Indians, assess the vulnerability and risk posed by those hazards to community-wide human and structural assets, develop strategies for mitigation of those identified hazards, present future maintenance procedures for the plan, and document the planning process.

Tribal Assurances

Requirement: 201.7(c)(6): The must include assurances that the Indian Tribal government will comply with all applicable Federal statutes and regulations in effect with respect to the periods of which it receives grant funding, in compliance with 13.11(c) of this chapter. The Indian

[16] Section 322 is enacted under Section 104 of DMA2K.

Tribal government will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required in 13.11(d) of this chapter.

The Kaibab Band of Paiute Indians will comply with all applicable Federal statutes and regulations in effect for those periods when the Tribe receives grant funding per the DMA2K requirement §201.4(c)(6).

SECTION 1: INTRODUCTION

What is Hazard Mitigation?

The first step to understanding the Kaibab Band of Paiute Indians Hazard Mitigation Plan is to understand what hazard mitigation is. Hazard mitigation is defined as 'any action taken to reduce or eliminate the long term risk to human life and property from human-caused or natural hazards. A hazard is any event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other structural and financial loss. As communities continue to grow, hazard mitigation will play an even more important role in the government's primary objective of protecting its citizens' health, safety and welfare.

Hazard mitigation aims to make human development and the natural environment safer and more resilient. Hazard mitigation generally involves altering the built environment to significantly reduce risks and vulnerability to hazards so that life and property losses can be avoided or reduced. Mitigation can also include removing the built environment from disaster prone areas and maintaining natural mitigating features, such as wetlands or floodplains. Hazard mitigation makes it easier and less expensive to respond to and recover from disasters by breaking the damage and repair cycle.

Examples of hazard mitigation measures include, but are not limited to the following:

- Development of mitigation standards, regulations, policies, and programs
- Land use/zoning policies
- Strong statewide building code and floodplain management regulations
- Dam safety program, seawalls, and levee systems
- Acquisition of flood prone and environmentally sensitive lands
- Retrofitting/hardening/elevating structures and critical facilities
- Relocation of structures, infrastructure, and facilities out of vulnerable areas
- Public awareness/education campaigns
- Improvement of warning and evacuation systems

Benefits of hazard mitigation include:

- Saving lives and protecting public health
- Preventing or minimizing property damage
- Minimizing social dislocation and stress
- Reducing economic losses
- Protecting and preserving infrastructure
- Less expenditures on response and recovery efforts

In 2005, a study by the National Institute of Building Sciences through its Multi-Hazard Mitigation Council, reported to Congress that money spent on reducing the risk of natural hazards is a sound

investment. On average, a dollar spent on hazard mitigation saves the nation about $4 in future benefits. In addition, FEMA grants to mitigate the effects of floods, hurricanes, tornados, and earthquakes between 1993 and 2003 are expected to save more than 220 lives over approximately 50 years.

Plan Description

Kaibab Band of Paiute Indians of the Kaibab Indian Reservation will be known throughout this plan as Kaibab Band of Paiute Indians (KPIT or Tribe) officials and public servants recognize that natural and human-caused hazards pose a significant threat at varying degrees of magnitude and frequency, to the safety and economic stability of the Tribe and its residents. Tribal officials understand that not addressing the risk can result in increased costs, both in terms of financial and human losses. Accordingly, the Kaibab Band of Paiute Indians has prepared the **2014 Kaibab Band of Paiute Indians Hazard Mitigation Plan** (the Plan) with a desire to become more aware of the Tribe's vulnerability to natural and human-caused hazards, and to develop mitigation strategies that reduce the risks associated with those hazards.

This plan is arranged and prepared to satisfy Tribal level planning requirements mandated by the Disaster Mitigation Act of 2000 (DMA2K). DMA2K requirements are provided as appropriate in each section. The plan is divided into five primary sections as follows:

- Section 1 – Introduction
- Section 2 – Planning Process Documentation
- Section 3 – Risk Assessment
- Section 4 – Mitigation Strategy
- Section 5 – Plan Maintenance Procedures
- Section 6 – Plan Tools

SECTION 2: COMMUNITY DESCRIPTION

Section Changes

If none, simply state there were no changes to this section during this Plan update.

Tribal Sovereignty

The Kaibab Band of Paiute Indians is a federally recognized Tribe by Executive Order on June 11, 1913 and July 17, 1917 and is organized and established as a sovereign nation pursuant to the provisions of the Indian Reorganization Act of June 18, 1934. The Tribe adheres to its Tribal constitution and sovereign government status. The Government and Council consist of six council members which includes a Chairman, Vice Chairman.

The Kaibab Band of Paiute Indians (KPIT) land is held in trust by the federal government through the Secretary of the Interior and, therefore, requires compliance with federal laws as it pertains to the environment and community land within the reservation boundaries. The Kaibab Paiute are a member of the Southern Paiute Nation which extends over the Great Basin and San Juan –Colorado River drainage area. The members speak a Uto-Aztecan language along with the English.

According to the KPIT Integrated Resource Management Plan[17], the KPIT Reservation was officially established in 1907 on a remote 12 mile by 18 mile area of land located 50 miles north of the Grand Canyon and up to the northern Arizona and Utah border. But near the center of the reservation lies two areas that are reserved as a monument to Mormon settlers called "Pipe Spring National Monument," and Moccasin Village community as was recognized by the U.S. Government as a settlement separate and apart from the Reservation. This was after the Mormons built their forts and established themselves around Paiute Springs. This resulted in the Paiute lands becoming overgrazed for food, and the depletion of water resources, which caused the reservation to be established. Prior to the Mormon pioneers settling in the area, slavery was prevalent by the Ute and Navajo horsemen until the signing of the Treaty of Guadalupe.

Geography

The Kaibab Paiute Indian Reservation (Reservation) is located in a remote area of northern Arizona, south of Kanab, Utah, west of Fredonia, and east of Colorado City, up to the Utah border as illustrated by Figure 1-1. The Reservation covers 120,431 trust acres and consists of five villages: Kaibab, Eagle Mountain (Steam Boat), Juniper Estates, Six-Mile and Redhills. The centroid of the Reservation is located approximately at longitude -112.68 degrees west and latitude 36.92 degrees north. Elevations vary from a low of approximately 4,400 feet above sea level near US 389 on the eastern side of the Reservation and rises to an elevation of 7,058 feet above the Vermillion Cliffs towards the Utah border.

The only major transportation route through the reservation is State Highway 389 which is shown on Figure 1-2.

Terrestrial characteristics of the Reservation include the Colorado Plateau Shrubland and desert grassland situated along Kanab Creek with terrain that varies from the nearly flat plateau along State Highway 389 to the mountainous area of the Vermillion Cliffs and Moccasin Mountains range. The

[17] Kaibab Band of Paiute Indians Integrated Resource Management Plan, April 2006

geographical characteristics of the Reservation have been mapped entirely within Colorado Plateau Shrubland terrestrial ecoregion[18]. Two other ecoregions are mapped for areas near the Reservation. Figure 1-3 depicts the location of the Reservation with respect to each ecoregion, which are described as follows:

- **Arizona Mountain Forests** – this ecoregion contains a mountainous landscape, with moderate to steep slopes. Elevations in this zone range from approximately 4,000 to 13,000 feet, resulting in comparatively cool summers and cold winters. Vegetation in these areas is largely high altitude grasses, shrubs, brush, and conifer forests.
- **The Colorado Plateau Shrublands** - This ecoregion includes numerous small cities and towns, including Holbrook, Page, and Winslow. Elevations in this zone average around 4,000 to 5,000 feet. Vegetation in this ecoregion is comprised mainly of Plains Grassland and Great Basin Desert scrub. Temperatures can vary widely in this zone, with comparatively warm summers and cool winters.
- **The Mojave Desert** – this ecoregion covers a small portion of northwest Arizona, including portions of Coconino and Mojave Counties. The elevation varies in this region from 1,500 feet to almost 4,000 feet for some of the mountains. Normally, the climate in this ecoregion is very hot and dry during the summer months and relatively warm during the winter.

[18] URS, 2004, *State of Arizona Hazard Mitigation Plan – Interim Draft – Community Profiles and Hazard Identification/Profiles.*

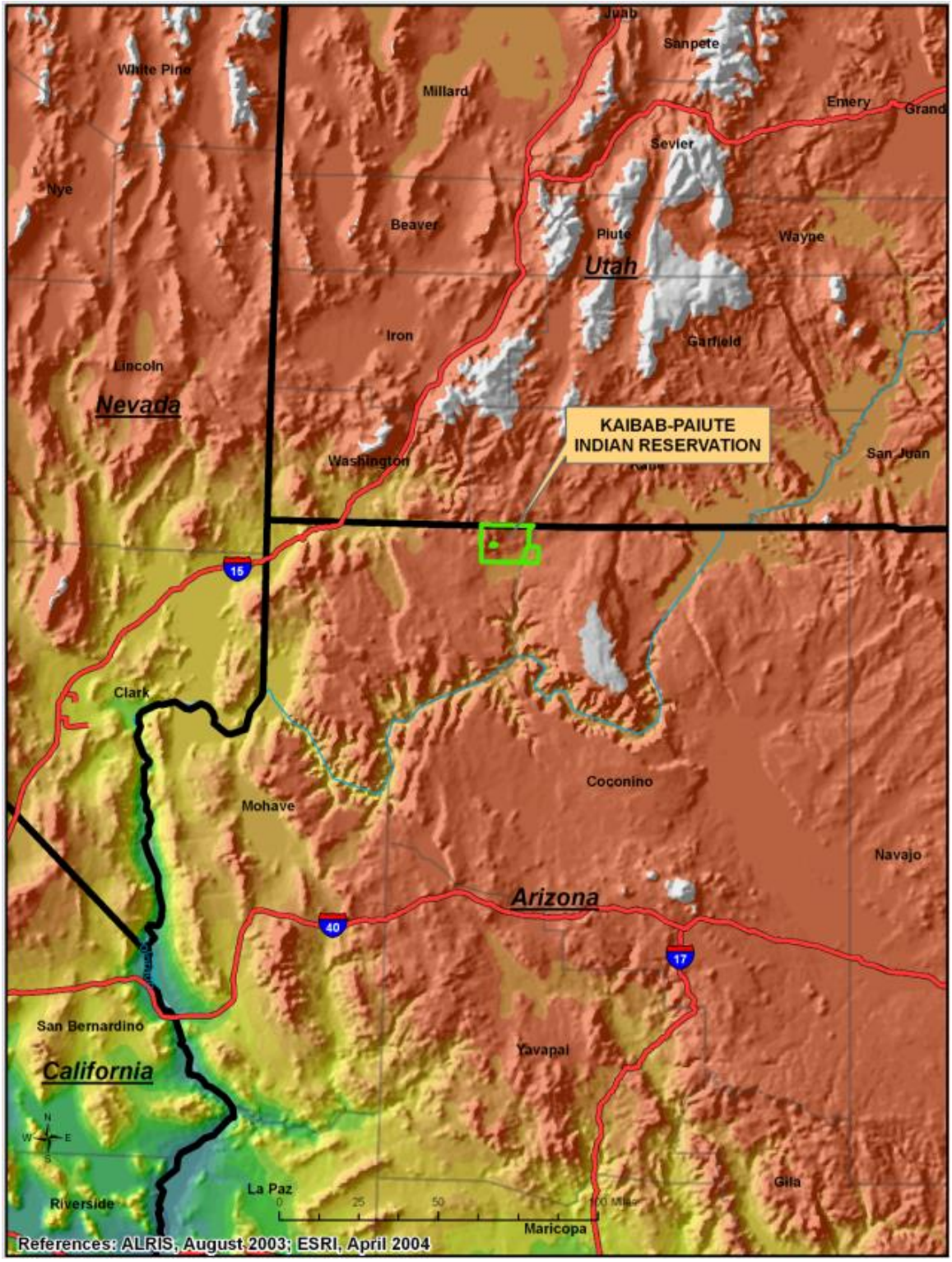

Figure 1-1

Vicinity Map

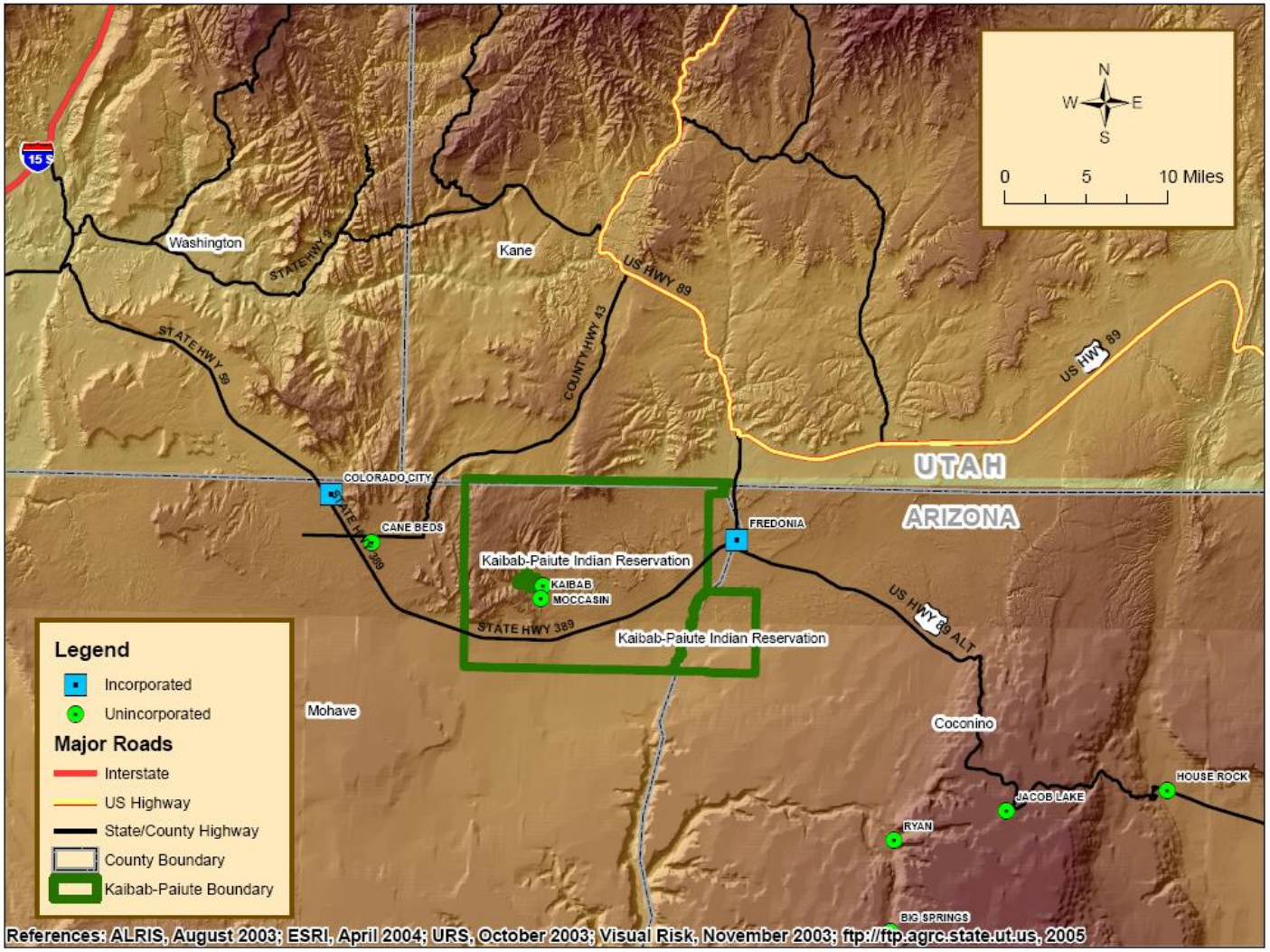

Figure 1-2

Transportation Routes

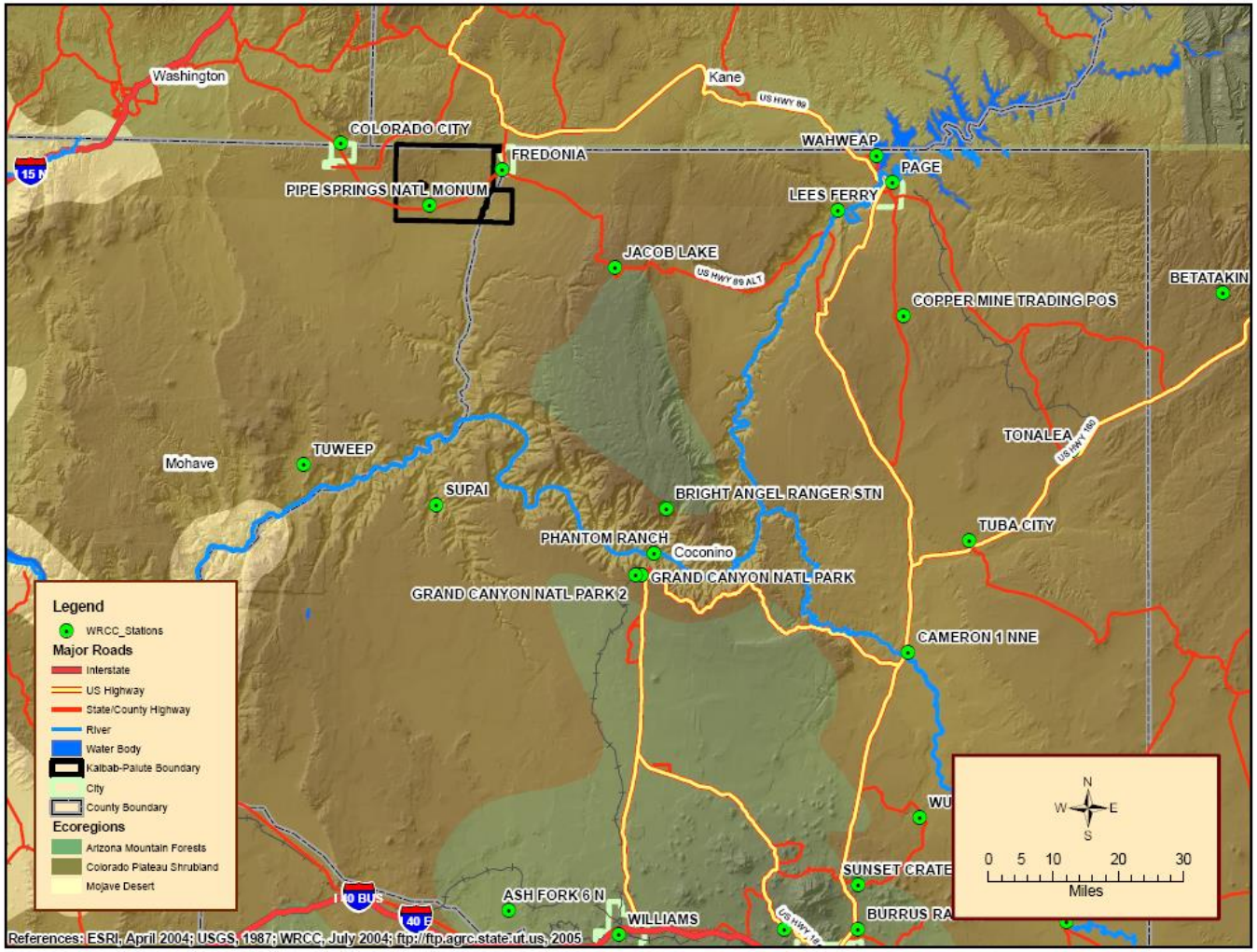

Figure 1-3

Terrestial Ecoregions

Climate

The climate on the Reservation is hot and dry during the summer, and somewhat mild during the winter. Climate statistics for weather stations in the vicinity of the Reservation are produced by the Western Region Climate Center[19]. Locations of reporting stations within or near the KPIT Reservation are shown on Figure 1-2. The nearest weather station, Pipe Springs National Monument, is located in the center of the Reservation at an elevation of 4,920 feet. The Pipe Springs National Monument is located on an island of non-indian land surrounded by the Reservation which is considered to be representative of the Reservation climate conditions. Weather data at this station has been collected and recorded continuously since 1963. Average minimum temperatures for the Pipe Springs National Monument Station range from below freezing during the winter months and for the average maximum to over 90 degrees Fahrenheit during the hot summer months. The extreme temperatures vary between 105 degrees during summer to 10 degrees below zero in the winter. Figure 1-4 presents a graphical depiction of temperature variability and extremes throughout the year for the Pipe Springs National Monument Station.

Precipitation on the Reservation is governed to a great extent by the season of the year. From November through March, storm systems from the Pacific Ocean cross the state as broad storms producing mild precipitation events and snowstorms at the higher elevations. Summer rainfall begins early in July and usually lasts until mid-September. Moisture-bearing winds move into Arizona at the surface from the southwest (Gulf of California) and aloft from the southeast (Gulf of Mexico). The shift in wind direction, termed the North American Monsoon, produces summer rains in the form of thunderstorms that result largely from excessive heating of the land surface and the subsequent lifting of moisture-laden air, especially along the primary mountain ranges. Thus, the strongest thunderstorms are usually found in the mountainous regions of the central southeastern portions of Arizona. These thunderstorms are often accompanied by strong winds, blowing dust, and infrequent hail storms[20]. Figure 1-5 present tabular temperature and precipitation statistics for the Pipe Springs National Monument Station.

Monthly Climate Averages Based on Fredonia as Location			
Month	Avg High (F)	Avg Low (F)	Precip (In)
Jan	48	24	1.66
Feb	53	28	1.96
Mar	60	32	1.52
Apr	68	37	.99
May	78	44	.55

[19] Most of the data provided and summarized in this plan are taken from the WRCC website beginning at the following URL: http://www.wrcc.dri.edu/CLIMATEDATA.html.

[20] Office of the State Climatologist for Arizona, 2004. Partially taken from the following weblink: http://geography.asu.edu/azclimate/narrative.htm.

Jun	88	52	.34
Jul	93	60	1.06
Aug	90	59	1.51
Sep	83	51	1.51
Oct	71	41	1.59
Nov	57	31	1.20
Dec	48	24	1.37
http://www.weather.com/weather/wxclimatology/monthly/graph/86022			

Demographics

The Arizona Department of Commerce prepares annual community profiles for individual tribes, counties and communities within the State of Arizona. The 2003 profiles for the Kaibab Band of Paiute Indians are provided in Appendix B for reference.

As of October 2005, the total KPIT membership is estimated at 282 members. Table 1-1 summarizes population estimates for the Tribe, the county in which its located, and other nearby communities in 10-year cycles beginning in 1990 and projecting through 2030. The number of members living on the reservation is 128 and the remaining live elsewhere not on the reservation. The primary population centers are within six community sites. These sites are recognized as Upper Kaibab Village, Lower Kaibab Village, Six-Mile Village, Juniper Village, Red Hills Village and Eagle Mountain Village (Steamboat). Currently, there are 102 houses/dwellings on the reservation, 25 low rent houses and 63 mutual rent houses.

Population Statistics for the KPIT, Surrounding Counties, and Nearby Incorporated Communities

Jurisdiction	1990	2000	2010	2020	2030
Kaibab Band of Paiute Indians	165	196	240 (+22.4%)	No Data	No Data
Fredonia	n/a	1349	1507	1671	1811
Colorado City	n/a	4,150	5,500	6,626	7,598
Mohave County	93,497	147,529	194,403	236,396	270,785
Note: Figures for 1990 and 2000 from Arizona Dept. of Commerce and Census Data. Figures for 2010-2040 from AZ Dept of Economic Security with projections that are based on pre-1997 trends.					

Development History

The Kaibab Paiute Tribe has a long history dating back 10,000 years ago. Originally, the tribe hunted large game prior to the Great Basin drying up, but afterwards, adjusted to small game hunting and collecting plants for food. During this era, one or more families would live

at various watering holes and then migrate based on the seasons and availability of food and water. Eventually, the area of migration extended to the Colorado Plateau which led them to the numerous springs and water seeps of the Vermillion Cliffs which enabled them to utilize the grasslands and plateaus for living.

The Tribe had neither chiefs nor permanent leaders and was not lead to be nomadic by nature. Because of the diversity of the terrain, the natural resources were readily available to them within a day's walk.

During this time, their territory consisted 5,000 square miles that extended north from the Grand Canyon to the Markagant and Paunsaugant Plateaus and from the Paria River and House Rock Valley westward to the Kolob Plateau.

In 1776, two Catholic Fathers, Father Dominguez and Father Escalante explored the area while finding an overland route to the Spanish missions in California. Ute and Navajo horsemen pressed the existence of slavery and soon after this period the Mormon settlers arrived in the mid 1800's.

While the Mormons built their fort and established the settlement around Paiute springs (known specifically as Moccasin Spring and Pipe Spring) the Paiutes became dependent on the new settlers. The Paiute lands became overgrazed and the sources of food and water were overtaken by the newcomers. As time progressed, the Reservation was established in 1907. Even though, the Kaibab Paiute Indians were awarded one-third of the total flow from each spring, the control of the water flow was still out of the control of the Paiute Indians.[21]

Currently, the Kaibab Band of Paiute Indians is entirely dependent on Federal and State Government grants and revenue received through a gaming agreement. Neither of these sources is guaranteed nor will always be available in the future. A portion of this revenue is being managed in an investment fund, but for whatever reason, if it were no longer available, the KPIT would not be able to sustain their current status for any extended period of time.

Employment for members who reside on the reservation have several barriers to overcome. First of all, the closest town, Fredonia, Arizona for employment is 14 miles away. As it is, Fredonia does not provide many employment opportunities for its citizens or Tribal members. Within a one-hour drive, St. George is considered a large employment center for members. Otherwise, tribal enterprises consist of a Mobile Convenience Store that provides limited jobs and little revenue, and an RV Park which generates approximately $1500 a year. Also, the Tribe maintains a herd of livestock that includes 80 cows, 6 bulls, and 18 replacement heifers. The annual gross revenue from the cattle herd is between $25,000 and $30,000. The Tribe also owns approximately 8 papered quarter horses. The colts raised are "green broke" and sold for $1,000 to $3,000 per head. This amount is decreased by at least 25% by paying what is owed to the cattle and farm manager.

Future Development

Within the "Integrated Resource Management Plan" for the Kaibab Band of Paiute Indians, the resource management strategies are discussed for a three, five, and seven year projection plan. The purpose of this plan is to provide a roadmap to sustainable resources while promoting economic growth for the Tribe.

[21] Kaibab Band of Paiute Indians Integrated Resource Management Plan, April 2006

Development Goals and Business Ventures			
Areas of Concern For Economic Growth	**3 Year Goal**	**5 Year Goal**	**7 Year Goal**
Communication	Improve communication through the use of newsletters	Develop and maintain website	Hire an Information Technologist
Education	Regular home visit of families w/ages 5+	More in-person contact between Social Services and Behavior Department	Seek additional funding provided by FACE for children Birth – 5 ages
Individual Tribal Members Education	Provide on-site tutoring for school age children K-12	Integrate cultural and public education into core curriculum	High school age student incentive programs to encourage higher education.
Cultural Resources	Utilize existing data processing equipment to record cultural information	Through Workforce Investment Act employ young members to record life stories of elderly	Seek assistance and input from the Culture Conservancy in recording cultural history.
Language Program	Implement incentive Program for learning Kaibab Paiute Native Language	Print portion of newsletter in Native Language for incentive in learning the Language	Discuss with Fredonia public school system in providing school credit for Kaibab Paiute Language
Employment	1) Foster additional education and employment opportunities for Tribal Member 2) Establish affordable childcare	Establish an all Native American Construction Crew for on-site and off-site housing projects and/or sub-contracted to contractors	Establish/partnership with major company to establish call center on the reservation, managed and staffed by Tribal Members.
Tribal Enterprises: Tourism	1) Establish bike and foot paths specifically for tourists 2) General clean-up and repairs for RV Park users	1) Construction of trail from RV Park to fishponds and Monument at Pipe Springs. 2) Provide additional activities and equipment for tourist (i.e fishing, etc.)	Achieve complete renovation of RV Park and plan associated tourist sites a) gift shop, b) community garden/medicine garden, c) Farmer's Market.

Tribal Enterprises: Livestock Venture	Perform study of the possibility of improving soil conditions for production of grasses	Establish small goat herd for providing revenue through milk, meat and wool production.	Consensus of Tribal Members for no further economic development on the Reservation itself so not to disturb natural landscape. (i.e. commercial buildings- grocery stores and retail stores)
Tribal Enterprises: Orchard/Community Garden	Fruit tree specialist to analyze care needed for existing orchard including pruning, herbicide/pesticide, etc. Purchase smudge pots, tractor, etc.	N/A	N/A
Tribal Enterprises: Energy	Conduct feasibility study to determine solar/wind generated power potential for Reservation.	1) Investigate partnerships or other funding to construct one or more wind turbines. 2) Investigate the cost/benefits of building a solar farm on Reservation	1) Construct wind turbine and/or solar power farm and establish Kaibab Paiute Power Company to supply power to all structures on Reservation. 2) Sell additional power to others.
Soil Conservation	Re-introduce indigenous plants and allow specified land to rejuvenate itself	Hire a Permaculture Specialist to re-introduce plants and encourage the renewal of soil.	Work out grazing cattle allotments in order to renew soils
Water Allocation	1) Request formal clarification from Fed Govt. on current water allocation.	Seek assistance from Native American Rights Fund for acquiring additional water from Pipe Springs and Mocassin Springs	Set aside funds within general budget to pursue clarification and determination of water rights; and legal assistance.
Spring Water for Livestock/Wildlife	Improve water quality and measure flow from majority of springs	Encourage ownership of cattle and set up matching funds to replace outdated water lines	Pursue alternate sources of water in southern area through test wells or other means.
Fish Ponds	Check possibility of repairing current pond liner	Hire consultant to investigate use of two other ponds.	1) Pursue construction to make all 3 ponds useable for water storage, fisheries, and or wetlands. 2) Construct natural flow diversion wash into the ponds for irrigation of Community Park.
Note: Figures from Kaibab Band of Paiute Indians, Integrated Resource Management Plan, April 2006.			

SECTION 3: PLANNING PROCESS

Section Changes

DMA2K has placed a high degree of emphasis on the planning process in the development of multi-hazard mitigation plans. The purpose of Section 2 is to describe and document the planning process including selection of the planning team and primary points of contact, identification of the promulgation authorities, public involvement strategies, successes, and challenges, and general timeframes of planning events and milestones.

The Tribe initially chose to pursue the development of a local hazard mitigation plan and function as a sub-grantee to the State of Arizona. Under that premise, the Tribe participated in the multi-jurisdictional, county-wide planning processes for Mohave County. By November 2004, the Tribe had completed a significant portion of the planning process with Mohave County when it was discovered by ADEM that the Tribe must prepare a state level hazard mitigation plan to receive funds through FEMA. After November 2004, the tribal planning focus shifted from developing a local plan to preparing a state level plan. Local plan elements developed to-date are incorporated and revised as needed to address the state level planning requirements.

The following sections provide a summary of the Plan key contact information and promulgation authorities, and planning team selection, participation, and activities.

Points of Contact

The primary and secondary points of contact for the Plan are summarized below:

Primary POC:
Bioterrorism Coordinator
Meghann Olson
Kaibab Paiute Tribe
HC 65 Box 2
Fredonia, Arizona 86022
Office Phone: 928-643-8314
Fax: 928-643-8314
Email: molson@kaibabpaiute-nsn.gov

Secondary POC:
Fire Chief
Danny Bullets, Jr.
Kaibab Paiute Tribe
HC 65 Box 2
Fredonia, Arizona 86022
Office Phone: 928-643-8305
Fax: 928-643-8314
Email: kptwpf@hotmail.com

Promulgation Authority Information

The authorities responsible for promulgation of the Plan include:

- Ona Segundo, Chairperson
- Danny Bulletts Jr., Vice-Chairman
- Valencia Castro, Treasurer
- Benedict Pikyavit, Council Member
- LeAnn Shearer, Council Member
- Laura Savala, Council Member
- Tewyanna Pickyavit, Council Member

Planning Team Participation and Activities

In 2014…

Planning Team		
Name	**Agency/Organization/Company**	**Title**
Danny Bulletts, Jr.	Kaibab Band of Paiute Indians	Fire Chief
LeAnn Skrzynski	Kaibab Band of Paiute Indians	Environmental Program Director
Mary-Ann Richins	Kaibab Band of Paiute Indians	Tribal Administrator
Meghann Olson	Kaibab Band of Paiute Indians	BT Coordinator
Ona Segundo	Kaibab Band of Paiute Indians	Chairwoman
Charlie Bulletts	Kaibab Band of Paiute Indians	Cultural Resources

…As a matter of public involvement, the Planning Team prepared and distributed a notification of the plan development and process via direct mailing to all KPIT members through the Tribal Newsletters. A copy of the notice is provided in Appendix C.

~~Planning Team Activity~~		
~~Meeting Date~~	~~Agenda Items~~	~~Summary of Highlights~~
~~November 17, 2006~~	• ~~Introduction~~ • ~~Discussion of Planning Focus Shift from Local Plan to State Plan~~ • ~~TPT Responsibilities~~ • ~~Planning Team Organization~~ • ~~Public Involvement Strategy~~ • ~~Risk Assessment~~ • ~~Identify Hazards~~ • ~~Profile Hazards~~ • ~~Asset Inventory~~ • ~~Mitigation Strategy~~ • ~~Capability Assessment~~	• ~~Identified and listed historical hazard events.~~ • ~~Began the CPRI process for prioritization of hazards.~~ • ~~Utilized GIS to perform asset inventory.~~ • ~~Discussed Capability Assessment information.~~ • ~~Discussed base mapping and hazard profile information.~~ • ~~Fire Chief Danny Bulletts identified as secondary POC.~~ • ~~Delegated homework assignments prior to the next meeting, including:~~ • ~~Compile Historical Hazards list.~~ • ~~Compile Asset Inventory list.~~ • ~~Compile Capability Assessment information.~~ • ~~Develop public information strategy plan~~ • ~~Next meeting scheduled for January 8, 2007.~~

Planning Team Activity		
Meeting Date	**Agenda Items**	**Summary of Highlights**
February 1, 2007	• Public Involvement Strategy • New Team Members • Promulgation List • Historical Hazards • Asset Inventory • Hazard Profiling • Prioritize Hazards • Hazard Maps • Vulnerability Analysis Process • Capability Assessment • Draft Goals and Objectives • Discuss Plan Maintenance Procedures • Establish Monitoring and Evaluation Schedule	• Provided update on public involvement strategy • Identified potential members for planning team. • Confirmed prioritization of hazards for vulnerability analysis. • Confirmed dam inundation, flood, fire and hazmat for quantitative analysis with remainder as qualitative. • Draft Goals and Objectives. • Discussed and confirmed Plan Maintenance Procedures • Discussed and confirmed Monitoring and Evaluation Schedule. • Discussed and confirmed Plan Update process. • Task Assignments: • Meghann: email newsletter article. • Meghann: email list of names of council members to adopt the plan • MaryJayne: Obtain a copy of Juniper Village Wildfire Protection Plan. • Meghann: Follow-up on Capability Assessments • Meghann: Follow-up on Asset Inventory Worksheet • Review and confirm goals and objectives.

Planning Team Activity		
Meeting Date	**Agenda Items**	**Summary of Highlights**
July 12, 2007	• Public Involvement Strategy • Review Vulnerability Analysis • Brainstorm Mitigation Action/Projects • Review Capability Assessment • Review Goals and Objectives • Perform Benefit/Cost Review • Prioritize Projects • Implementation Strategy • Finalize Plan	• Received newsletter of hazard mitigation activities. • Reviewed prioritized hazard list and determined additional goals needed for transportation accident; landslides/mudslides and transportation accident. • Discussed need for additional mapping for Sevier earthquake fault running through the reservation • Discussed results of Vulnerability Analysis the keypoints: • Ona Segundo needs HAZUS data to accurately reflect actual population and estimated replacement costs. (JE Fuller) • Danny Bullets and Don Johnson suggested wildfire coverage include additional "high" areas with a half- mile buffer leading to and around Kaibab and Juniper Village. (JE Fuller) • Obtain Juniper Village Fire Protection Plan from BIA and forward copy to JE Fuller. (Meghann) • Hazmat coverage include Mount Trumbull Rd as a main hazmat transportation corridor. (JE Fuller) • Reviewed Capability Assessment and noted minor changes to the section. • Completed additional Goals and Objectives. • Formulated Mitigation Action/Projects and performed benefit/cost review, utilizing the STAPLEE method; identified funding sources and interim activities. Lengthy discussion involving projects including Kaibab Village flooding; wildfire protection; siren notification and alert system; and alternate transportation roads during emergency situations, etc. • Final Adoption of Plan: JE Fuller will prepare a timeline for meeting the September 1st Council review timeframe.
April 23, 2008	• Overview of CFR 201.7 and FEMA Tribal Crosswalk • Assessing Vulnerability: Identifying Future Structures • Analyzing Development Trends • Cultural and Sacred Sites • Tribal Capability Assessment • Continued Public Involvement	• Kaibab Paiute does not encourage building development, and plans to remove old building stock without replacements. (No locations or numbers of structures to be identified) • The only possible future development is uranium mining off Trumbull Road. (LeAnn Skrzynski will provide write-up) • The Tribal cultural person to provide descriptions of cultural sites and potential hazard impacts. • Limited capabilities available for funding; no advocate for spearheading mitigation projects. (Meghann Olson will provide write-up) • In continuing public involvement in plan maintenance, general tribal members will have opportunities to participate and comment annually on measures taken by the tribe. (Meghann will provide write-up.) • For the purpose of this plan, an opportunity will be available for public comment prior to Tribal Council approval through a newsletter.

Agency Coordination

The Tribe participation in the Mohave County Planning Team and the subsequent tribal planning efforts have involved the Tribe with many different entities including neighboring towns, cities, and counties, state and federal agencies, and a few private organizations.

Plan and Program Integration

Requirement: 201.7(c)(4)(iii): The plan maintenance process shall include a process by which the Indian Tribal government incorporates the requirements of the mitigation plan into other planning mechanisms such as reservation master plans or capital improvement plans, when appropriate.

The integration of the Plan with other tribal planning programs is an important part of the overall planning process and future success. Below is a list of current tribal planning efforts that are either related to, referenced in, and/or are parallel to the Plan. The intention of the Tribe is to integrate the Plan into any updates of the plans listed in the table below, as appropriate, and to ensure correlation of common planning elements between each of the plans listed and the Plan. The Tribe will also reference the Plan when developing new plans to associate and compliment the Tribe's overall mitigation goals.

Existing Planning and Study Documents

Plan/Study Name	Description	Plan/Study Author	Date Completed or Implemented	Plan/Study Owner
Ecology Ordinance				Kaibab Paiute Tribe
Cultural Resources Protection Ordinance				Kaibab Paiute Tribe
Delegation of Authority Ordinance #22				Kaibab Paiute Tribe
NIMS/ICS Implementation	States that the Tribe will receive training in and implement the National Incident Management System and Incident Command System in the event of a man-made or natural disaster.		2004	Kaibab Paiute Tribe

Public Involvement

An important and valuable aspect of the planning process is public involvement. The term "public" is defined by the Tribe as "All tribal members that are not directly or indirectly involved in the multi-hazard mitigation planning process and plan development." Members of the community, not specifically participating on the planning team or employed by the community, can prove to be great assets to the hazard mitigation planning process. The KPIT Planning Team employed the following strategies to solicit public involvement and input to the planning process:

- Announced in the "Are You Ready" Tribal Newsletter on the development of the plan and made available the FAQ brochure and planning staff for members that would have questions.
- Used the "Are You Ready" Newsletter to discuss the planning process prior to the written draft, and made available the plan for public comment prior to promulgation.

Copies of the newsletters and a copy of the FAQ placed in Appendix C.

SECTION 4: RISK ASSESSMENT

Section Changes

For the purpose of this Plan update…

One of the key elements to the hazard mitigation planning process is the risk assessment. In performing a risk assessment, a community determines "what" can occur, "when" (how often) it is likely to occur, and "how bad" the effects could be[22].

The risk assessment for the Tribe was performed for the entire reservation, with much of the information input and development being accomplished by the Planning Team.

Hazard Identification

Hazard identification is the process of answering the question: *"What hazards can occur in my community or jurisdiction?"* Hazards impacting the Tribe can be classified into two general categories, Natural and Human-Caused. The Kaibab Paiute Planning Team used this list as a starting point for the hazard identification process. Detailed definitions for each of these hazards are provided in the Glossary of Terms in Appendix D.

Below is a list of hazards that pose a significant threat to the Tribe. The list was arrived at using a systematic process of elimination that considered relevance, historical significance and experience, and catastrophic potential.

- Drought
- Earthquake
- Flooding/Flash Flooding PG 41?
- Hazardous Materials Incidents
- Landslides/Mudslides
- Thunderstorm/High Winds
- Transportation Accident
- Tropical Storms/Hurricane
- Wildfires

Hazard Profiles

Requirement: 201.7(c)(2)(i): The risk assessment shall include a description of the type, location, and extent of all natural hazards that can affect the tribal planning area. The plan

[22] National Fire Protection Association, 2000, *Standard on Disaster/Emergency Management and Business Continuity Programs*, NFPA 1600.

shall include information on previous occurrences of hazard events and on the probability of future hazard events.

Hazard profiling answers the question: "How bad can it get?"[23] Developing a hazard profile includes researching and mapping historic hazard events, obtaining other hazard mapping, analysis and studies, and for this plan, estimating the parameters used to establish the Calculated Priority Risk Index (CPRI) for each hazard considered.

Historic Hazard Events

Research and mapping of historic hazard events is an important part of the hazard profiling process. These events not only establish a historic basis for mitigating the hazard, but also provide real-world estimates of the economic and human impacts of the hazard. Historic event data with a significant period of record can also be useful in developing probability statistics.

The State of Arizona, in the development of its hazard mitigation plan, compiled a list of historic hazard events for counties across the State of Arizona. The Planning Team reviewed those records for references that were specific to, or may have included the Tribe. The Planning Team also researched tribal files and databases for additional historic hazard records. Two data sets were developed to reflect the historic hazards impacting the Tribe. One data set summarizes historic hazard events and loss data that could be solely attributed to the Tribe. The other data set summarizes events that are more regional in scope, and that may include multiple counties and communities including the KPIT Reservation, and include reported losses for jurisdictions other than the Tribe. The state's criteria for including a historic hazard event were:

- ✓ Reported damages of $50,000 or more
- ✓ At least one injury and/or fatality
- ✓ Historically significant event

The state database was augmented by adding records using the same criteria, with the exception that all damages greater than $1 was used. The table below summarizes the results of the historic hazard research. The top hazards selected by the Planning Team are indicated by bold type.

When reviewing the table data, the reader should keep in mind that the numbers reported reflect the availability of such data from the sources researched, and that in reality it is expected that the numbers significantly under-predict the losses actually sustained over the period of record represented. A more thorough search for historic data in future planning efforts is warranted; however, for this first round of planning, the data sets can be considered representative.

Hazard Descriptions

The following are general summaries of the top hazards (those shown in **bold** print) chosen by the Planning Team as the most relevant and significant hazards impacting the Tribe.

[23] FEMA, 2001, *Understanding Your Risks; Identifying Hazards and Estimating Losses*, FEMA 386-2.

Historic Hazards for the Kaibab Band of Paiute Indians									
	Statewide or Multiple Jurisdictional Declarations That Included Kaibab-Paiute Tribe					Historic Hazard Losses Attributable to the KPIT and Surrounding Communities			
		Recorded Losses					Recorded Losses		
Hazard	Records	Fatalities	Injuries	Damage Costs ($)		Records	Fatalities	Injuries	Damage Costs ($)
Dam/Levee Failure	0	0	0	$0		0	0	0	$0
Drought	59	0	0	$80,000		0	0	0	$0
Earthquake	1	0	0	$0		2	0	0	$0
Extreme Cold or Heat		0	0	$0		0	0	0	$0
Flooding/Flash Flooding	27	2	241	$12,130,000		10	1	120	$740,000
Hazardous Materials Incident	6	12	101	$1,120,000		1	0	1	$0
Infestation	2	0	0	$68,000		0	0	0	$0
Power/Utility Failure	1	0	0	$25,000		0	0	0	$0
Tornados/Dust Devils	11	0	8	$1,088,000		0	0	0	$0
Thunderstorm/High Winds	56	0	28	$7,621,000		5	0	7	$597,000
Transportation Accident	4	0	154	$0		1	0	0	$0
Tropical Storms/Hurricane	7	23	0	$5,800,000		0	0	0	$0
Wildfire	57	0	0	$0		8	0	0	$1,760,000
Winter Storm	2	0	0	$1,590,000		0	0	0	$0

Loss Estimations

Requirement: 201.7(c)(2)(ii)(B): The Plan should describe vulnerability in terms of an estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate.

Economic and human loss estimates for each of the major hazards identified in this section begins with an estimate of the potential exposure of critical and non-critical assets and human populations to those hazards. Exposure to critical and non-critical assets identified by the Planning Team is accomplished by intersecting the hazard profiles with the assets identified.

Human or population exposures are estimated by intersecting the same hazards with 2,000 Census Data population statistics that have been re-organized into GIS compatible databases and distributed with HAZUS®-MH [24]. *It is duly noted that the HAZUS Data population statistics may not exactly*

[24] U.S. Department of Homeland Security, Federal Emergency Management Agency, HAZUS®-MH, build 31.

equate to the population statistics provided in Section 1.4.4 due to GIS positioning anomalies and the way HAZUS depicts certain census block data. However, the results are representative of the general magnitude of population exposures to the various hazards discussed.

Additional loss estimations for general residential, commercial, and industrial building stock inventories compiled in the HAZUS®-MH databases also represent a further depiction of the potential exposure. It is noted that for the KPIT Reservation, there are (76) residential and no commercial or industrial buildings identified in the HAZUS database. Accordingly, there are HAZUS building stock estimates for residential and none for commercial and industrial buildings. Once again, the statistic for residential buildings may not exactly equate to actual reality of number of building. Based on discussions with the Planning Team members, the numbers need to reflect as much as 20 to 25% more residential buildings. Specific loss estimates for each of the hazards in this section and descriptions of the estimation methodology, are summarized by hazard in the following pages.

Hazard CPRI Ranking

The State of Arizona has developed the Calculated Risk Priority Index (CPRI), which is a tool used to assess hazards based on an indexing system that considers probability, magnitude/severity, warning time, and duration. The CPRI value is obtained by assigning varying degrees of risk to each of the four categories for each hazard, and then calculating an index value based on a weighting scheme. The table below summarizes the CPRI element assignments and resulting value for each hazard, with the Planning Team top ranked hazards indicated by ***italicized bold*** text.

Calculated Priority Risk Index (CPRI) Categories and Risk Levels				
CPRI Category	**Degree of Risk**			**Assigned Weighting Factor**
	Level ID	**Description**	**Index Value**	
Probability	Unlikely	• Extremely rare with no documented history of occurrences or events. • Annual probability of less than 0.001.	1	45%
	Possible	• Rare occurrences with at least one documented or anecdotal historic event. • Annual probability that is between 0.01 and 0.001.	2	
	Likely	• Occasional occurrences with at least two or more documented historic events. • Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	• Frequent events with a well documented history of occurrence. • Annual probability that is greater than 0.1.	4	
Magnitude/ Severity	Negligible	• Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). • Injuries or illnesses are treatable with first aid, no deaths. • Negligible quality of life lost. • Shut down of critical facilities for less than 24 hours.	1	30%
	Limited	• Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). • Injuries or illnesses do not result in permanent disability and there are no deaths. • Moderate quality of life lost. • Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	• Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). • Injuries or illnesses result in permanent disability and at least one death. • Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	• Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure). • Injuries or illnesses result in permanent disability and multiple deaths. • Shut down of critical facilities for more than 1 month.	4	
Warning Time	Less than 6 hours	Self explanatory.	4	15%
	6 to 12 hours	Self explanatory.	3	
	12 to 24 hours	Self explanatory.	2	
	More than 24 hours	Self explanatory.	1	
Duration	Less than 6 hours	Self explanatory.	1	10%
	Less than 24 hours	Self explanatory.	2	
	Less than one week	Self explanatory.	3	
	More than one week	Self explanatory.	4	

CPRI Values by Hazard					
Hazard	**Probability**	**Magnitude Severity**	**Warning Time**	**Duration**	**CPRI**
Natural Hazards					
Drought	***Likely***	***Limited***	***24+ hours***	***More than one week***	***2.50***
Earthquake	***Possibly***	***Critical***	***Less than 6 hours***	***Less than one week***	***2.50***
Extreme Cold/Heat	Possibly	Limited	24+ hours	Less than one week	1.95
Flooding/Flash Flood	***Likely***	***Limited***	***6-12 hours***	***Less than 24 hours***	***2.60***
Infestations	Likely	Negligible	24+ hours	More than one week	2.20
Radon	Possibly	Negligible	24+ hours	More than one week	1.75
Landslides/Mudslides	***Possibly***	***Critical***	***Less than 6 hours***	***Less than 6 hours***	***2.50***
Thunderstorm/High Winds	***Highly Likely***	***Limited***	***6-12 hours***	***Less than 6 hours***	***2.95***
Tornados/Dust Devils	Possibly	Limited	Less than 6 hours	Less than 6 hours	2.20
Tropical Storms/Hurricane	***Possibly***	***Limited***	***24+ hours***	***Less than 24 hours***	***1.85***
Wildfires	***Likely***	***Critical***	***6-12 hours***	***More than one week***	***3.10***
Winter Storms	Possibly	Negligible	24+ hours	Less than one week	1.65
Human-Caused Hazards					
Arson	Possibly	Critical	Less than 6 hours	Less than 6 hours	2.50
Biological Hazards	Likely	Critical	24+ hours	More than one week	2.80
Civil Disobedience	Possibly	Limited	Less than 6 hours	Less than 6 hours	2.20
Civil Disturbance	Possibly	Limited	Less than 6 hours	Less than 6 hours	2.20
Civil Unrest	Possibly	Limited	Less than 6 hours	Less than 6 hours	2.20
Explosion/Fire	Possibly	Limited	Less than 6 hours	Less than 6 hours	2.20
Fuel/Resource Shortage	Possibly	Critical	24+ hours	More than one week	2.35
Hazardous Materials Incidents	***Likely***	***Limited***	***Less than 6 hours***	***Less than 24 hours***	***2.75***
Hostage Situation	Possibly	Limited	Less than 6 hours	Less than 24 hours	2.30
Hysteria (Mass)	Unlikely	Limited	Less than 6 hours	Less than 24 hours	1.85
Power/Utility Failure	Likely	Negligible	Less than 6 hours	Less than 24 hours	2.45
Sabotage	Unlikely	Critical	Less than 6 hours	Less than 24 hours	2.15
Special Event	Possibly	Limited	24+ hours	Less than 24 hours	1.85
Transportation Accident	***Highly Likely***	***Limited***	***Less than6 hours***	***Less than 6 hours***	***3.10***
Terrorism	Unlikely	Critical	Less than 6 hours	Less than 24 hours	2.15

Vulnerability Assessment

Requirement: 201.7(c)(2)(ii): The risk assessment shall include a description of the Indian tribal government's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the tribe.

The vulnerability assessment builds upon the previously developed hazard information by identifying the community assets and development trends and intersecting them with the hazard profiles to assess the potential amount of damage that could be caused by each hazard event.

For the Plan, the following tasks were performed as a part of the vulnerability assessment:

The following sections summarize the Planning Team efforts to assemble and analyze the data needed for the vulnerability assessment, and to present the results of the vulnerability analysis.

Asset Inventory

Requirement: 201.7(c)(2)(ii): The Plan *should* describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas.

For the purpose of this plan, an asset is defined as:

Any natural or human-caused feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Assets identified by the Planning Team are classified as either critical or non-critical facilities and infrastructure. Critical facilities and infrastructure are those systems within the reservation whose incapacity or destruction would have a debilitating impact on the Tribe's ability to recover following a major disaster, or to defend the people and structures of the Tribe from further hazards. Following the criteria set forth by the Critical Infrastructure Assurance Office (CIAO), the Tribe has adopted eight general categories[25] that define critical facilities and infrastructure:

1. **Telecommunications Infrastructure:** Telephone, data services, and Internet communications, which have become essential to continuity of business, industry, government, and military operations.
2. **Electrical Power Systems:** Generation stations and transmission and distribution networks that create and supply electricity to end-users.
3. **Gas and Oil Facilities:** Production and holding facilities for natural gas, crude and refined petroleum, and petroleum-derived fuels, as well as the refining and processing facilities for these fuels.
4. **Banking and Finance Institutions:** Banks, financial service companies, payment systems, investment companies, and securities/commodities exchanges.
5. **Transportation Networks:** Highways, railroads, ports and inland waterways, pipelines, and airports and airways that facilitate the efficient movement of goods and people.

[25] Instituted via Executive Order 13010, which was signed by President Clinton in 1996.

6. **Water Supply Systems:** Sources of water; reservoirs and holding facilities; aqueducts and other transport systems; filtration, cleaning, and treatment systems; pipelines; cooling systems; and other delivery mechanisms that provide for domestic and industrial applications, including systems for dealing with water runoff, wastewater, and firefighting.
7. **Government Services:** Capabilities at the federal, state, and local levels of government required to meet the needs for essential services to the public.
8. **Emergency Services:** Medical, police, fire, and rescue systems.

Other assets such as public libraries, schools, museums, parks, recreational facilities, historic buildings or sites, churches, residential and/or commercial subdivisions, apartment complexes, and so forth, are classified as non-critical facilities and infrastructure, as they are not necessarily "critical". ***They are however, very important to the Tribe and critical and non-critical should not be interpreted as meaning important and non-important.***

The Planning Team performed a detailed asset inventory for the KPIT. Data collected included the facility's physical location, description, and replacement cost. Those data sets are compiled in a separately bound appendix that, for security reasons, will not be generally distributed to the public.

Critical and Non-Critical Facilities	
Facility Type	**Kaibab Paiute Totals**
Critical Facilities and Infrastructure	
Telecommunications Infrastructure	**3**
Electrical Power Systems	**2**
Gas and Oil Facilities	**1**
Banking and Finance Institutions	**0**
Transportation Networks	**2**
Water Supply Systems	**7**
Governmental Services	**2**
Emergency Services	**2**
Non-Critical Facilities and Infrastructure	
Educational	**0**
Cultural	**1**
Flood Control	**0**
Commercial Business	**0**
Government Facilities	**2**

The table below summarizes the total replacement costs for Kaibab Paiute Indian Reservation. Replacement costs were generally estimated using insurance and/or current market value estimates.

Estimated replacement costs

Community	Number of Facilities	Percent of All Facilities	Total Estimated Replacement Cost
Kaibab Paiute Total	**22**	**100%**	**$9,360,510**

Cultural and Sacred Sites

For the purpose of this plan, the Kaibab Paiute Indian Tribe has determined at this time not to discuss cultural and sacred sites within the Reservation. This section would normally discuss these sites in terms of vulnerability to hazards, without discussing specific locations and monetary values.

HAZUS Summary	Residential Building Count	Residential Building Value (x$1000)	Residential Content Value (x$1000)	Residential Potential Economic Impact (x$1000)	Commercial Building Count	Industrial Building Count	Total of Building & Content Exposure (x$1000)	Total Estimated Loss (x$1000)
Kaibab Paiute Totals	**76**	**$8,865**	**$4,435**	**$13,300**	**0**	**0**	**$13,300**	
***Kaibab Paiute Totals**	**93**	**$9,300**	**4,650**	**$13,950**	**-**	**-**	**$13,950**	
HAZMAT								
High Risk	16	$1,868	$934	$2,801	0	0	$2,801	$0
Medium Risk	20	$2,376	$1,188	$3,564	0	0	$3,564	$0
Flood								
High Risk	0	$23	$12	$35	0	0	$35	$2
***High Risk**	28	$2,800	$1,400	$4,200	0	0	$4,200	$210
Wildfire								
High Risk	22	$2,638	$1,320	$3,958	0	0	$3,958	$792
Medium Risk	54	$6,227	$3,115	$9,342	0	0	$9,342	$467

Identifying Future Structures

The Kaibab Paiute Indian Reservation does not encourage development within the Reservation boundaries. The Tribal Planning Team considered the possibility of additional building sites for residential villages, but determined that while growth is not a primary concern, the elimination of older buildings sites is. The development of critical facilities is not foreseen in the near future. New developments, structures, or critical facilities are not expected within the next five years. With one exception, the possible construction of five to ten storage structures, north and adjacent to, the Tribal Administrative headquarters will be in "high hazard" area for wildfire and hazardous materials.

Development Trend Analysis

Any development of Tribal lands over the past several years has been guided by the oversight of the Tribal Council. The Tribe has been proactive in wildfire, flooding, HAZMAT, and drought

mitigation planning and will continue to do so for future development, if any. The following are hazard specific discussions regarding mitigation opportunities or perceived requirements regarding possible future growth and development of Tribal lands.

Drought

Currently, the entire State of Arizona is in the middle of a drought, wherein the State of Arizona has been declared eligible for some form of drought emergency assistance through the U.S. Department of Agriculture consecutively for the last 7 years. There is also a standing State of Arizona drought declaration that began in 1999 and will not close until drought conditions are ameliorated. Below is a map showing the seasonal drought forecast through October 2006 for the U.S.[26], as produced by the National Weather Service (NWS) Climate Prediction Center (CPC). Following is a map showing the amount of precipitation required to end the drought in the six months following February 2014[27].

Currently, all of Mohave County, including the Reservation, is designated to be within an ongoing drought zone and will require 15 to 20 inches of rainfall in the next six months to end the current drought cycle. The average annual precipitation for the Reservation is 18 inches, which means that a significant and abnormal volume of rain is needed to ameliorate the drought conditions.

The impact of a sustained drought affects many aspects of the industry, economy, and natural resources of the KPIT. Impacts include crop and ranching agriculture, potable water supplies, and tourism.

The primary water resources within the Reservation consist of two primary springs that KPIT should have one-third of the supply output, but is not subject to that fact for Pipe Springs and Moccasin Springs. The water allocation from these major springs was during a period where the Tribe was not recognized as an important stakeholder within the United States. In these modern times, KPIT has established goals on achieving and securing water rights for the benefit of tribal members to develop and maintain economic prosperity.

Currently, water storage on the Reservation consists of one pond that is up to nine feet deep and covers two acres. The pond has an artificial liner to prevent the loss of water from seeping into the ground and receives its water source via a long unreliable pipeline that extends to the base of the cliff region. The distance involved with piping the water supply creates problems for livestock owners and the Tribal Herd. Another source of domestic water includes groundwater wells which consist of a pump house and storage tank.[28]

[26] Climate Prediction Center, National Weather Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 2006, at the following URL: http://www.cpc.ncep.noaa.gov/products/expert_assessment/season_drought.gif.

[27] National Climatic Data Center, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, 2006, at the following URL: http://www.ncdc.noaa.gov/img/climate/research/drought/images/currend-6rain-pg.gif.

[28] Kaibab Band of Paiute Indians, Integrated Resource Management Plan

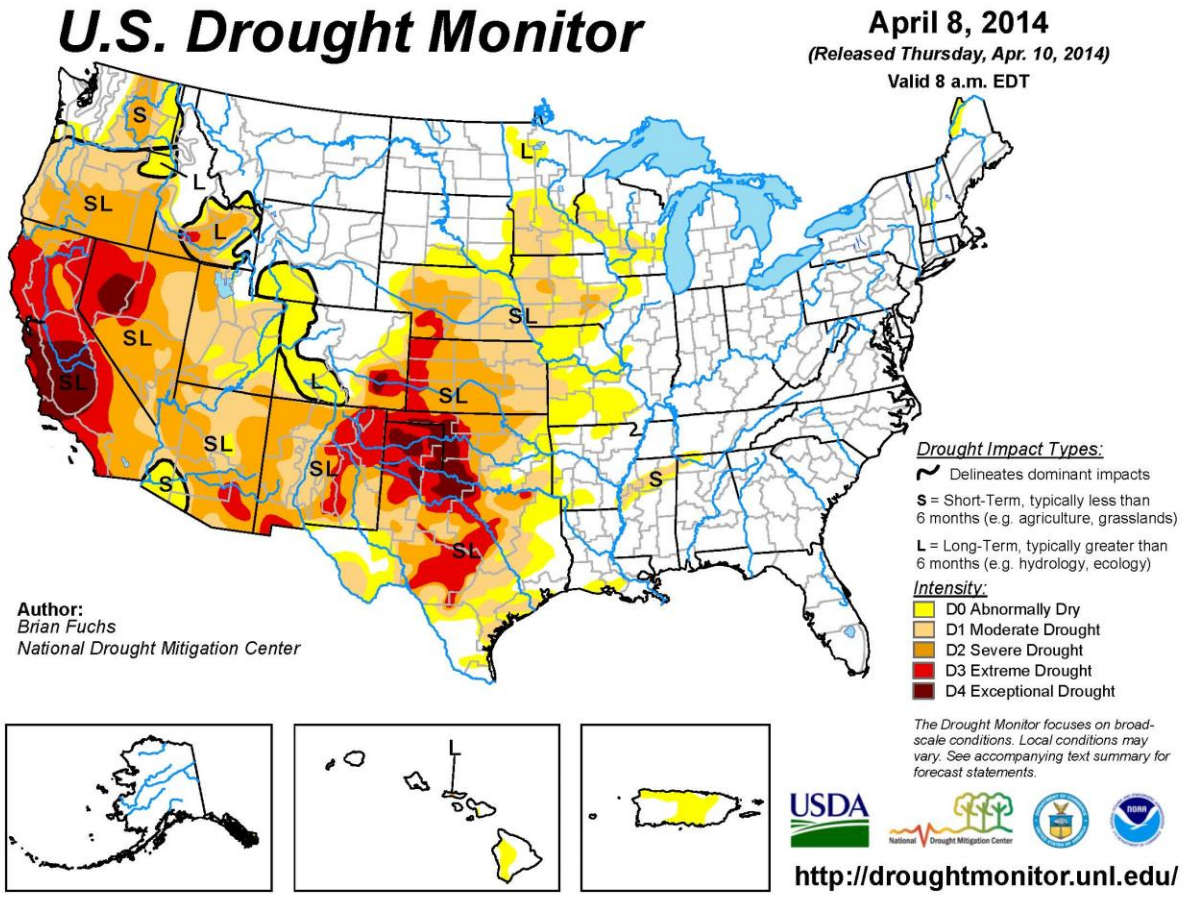

Figure 3-1

U.S. Drought Monitor April 2014

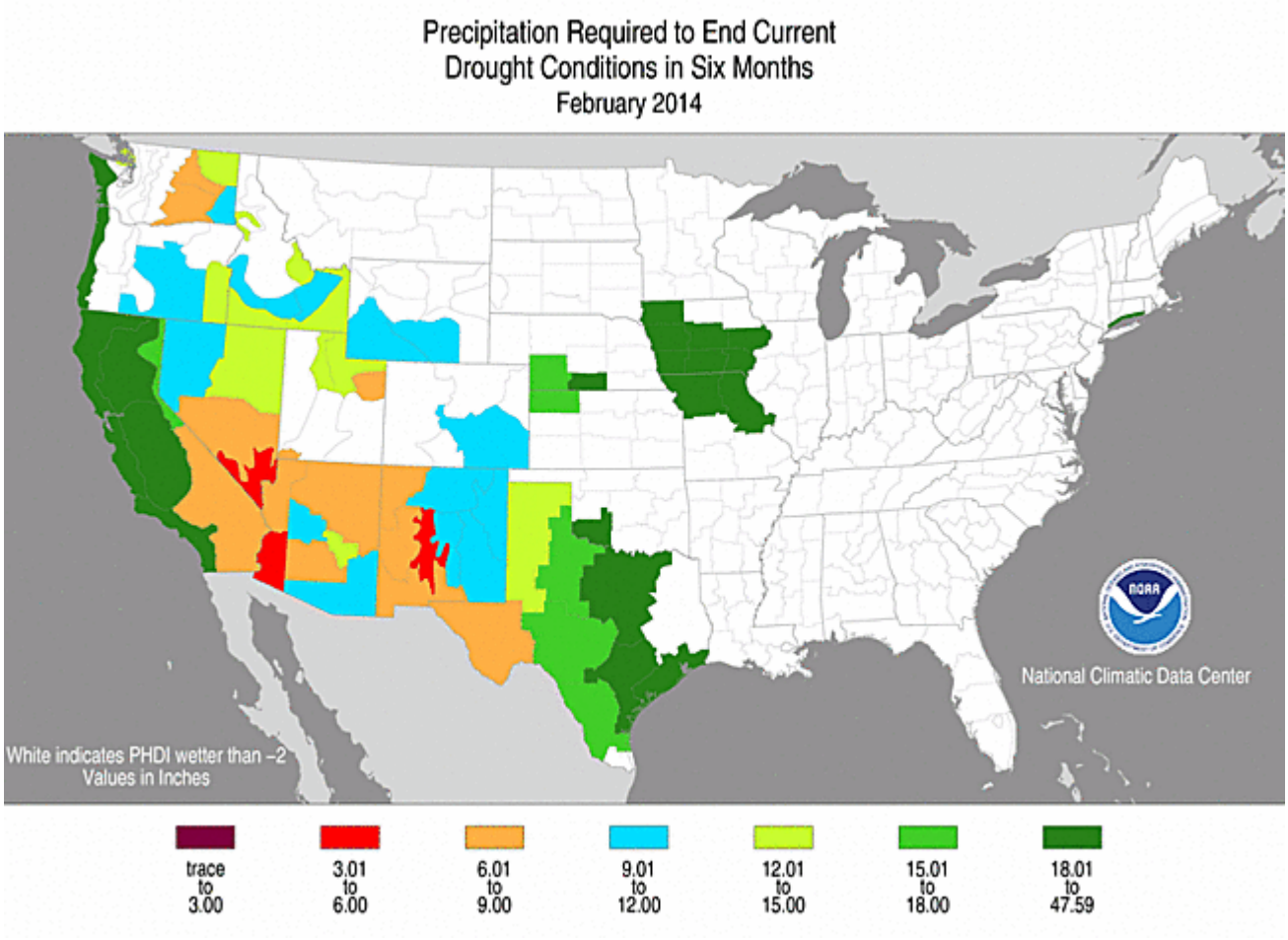

Figure 3-2

Precipitation Required to End Current Drought Conditions in Six Months

The impacts of drought to critical and non-critical facilities and building stock is generally indirect, in that drought is often a contributing factor to other hazards such as wildfire and flooding. Extended drought may weaken and dry the grasses, shrubs, and trees of wildfire areas, making them more susceptible to wildfire. Drought also tends to reduce the vegetative cover in watersheds, and hence decreases the interception of rainfall and increases the flooding hazard. The KPIT economic sectors most directly impacted by drought are livestock and wildlife. Estimation of losses attributable to drought are difficult and will not be made herein. A general description of impacts to livestock and water supplies is summarized in the following paragraphs.

Most of the Tribal livestock is watered by springs or stock tanks. During years of sustained drought, the springs become less productive and there is significantly less water available in the stock tank storage. This reduction in natural water forces KPIT members to haul water for replacement. A reduction of range feed due to drought also forces the feeding of more hay. The additional expense associated with hauling the water and feeding additional hay is difficult to estimate, but can easily cost over $100 per head per season.

The annual gross revenue from the cattle stock is approximately $25,000 to $30,000.

Development Trend Analysis

The Tribe is working on acquiring sufficient water rights to satisfy the demand, even during drought years. Mitigation opportunities may include developing a reserve or back-up, on-reservation potable water system to augment the current system. This system may also be used to provide supplemental livestock water in times of severe drought.

Earthquake

An earthquake is a sudden, rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the earth as the huge plates that form the earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free, causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates. This shaking can cause buildings and bridges to collapse; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill, old waterways, sandy soils with high water tables, or other unstable soil types are most at risk. Buildings, trailers and manufactured homes not tied to a reinforced foundation anchored to the ground are also at risk since they can be shaken off their mountings during an earthquake[29]. Earthquakes can occur at any time of the year and usually result in ground surface rupture, strong ground motion, slope failure, and/or liquefaction.

With several fault systems within Kane County, Utah, and Mohave County, Arizona including the Sevier and Toroweap Faults that run north and south through the center of the Reservation, earthquakes pose a "High Risk" to Kaibab Paiute Indian Reservation. Just north of the Reservation, in Kane County, sixty-four earthquakes have occurred from 1966 through 1993 ranging up to 3.6 magnitude as depicted in Figure 3-3 Some more notable earthquakes that have occurred in the past are the following:

- In 1887, Kane County experienced an earthquake with a magnitude of 5.5 – 5.9[30]
- In 1959, Kane County experience another earthquake with a magnitude of at least 5.5

The estimation of potential exposure and damage to severe earthquakes is moderate. The fact that the Sevier and Toroweap faults run through the main village (Kaibab) could create significant damage to building and structures based the location of the fault lines. The dollar amounts could be up to near $800,000 in damages. Based on the location, severity and what is at risk, this amount seems reasonable.

Development Trend Analysis

The fault lines within the Reservation have been identified by USGS. Avoiding any development on or near the fault lines along with following building codes for earthquake prone areas should be implemented.

[29] FEMA, 2004, web-based information at the following URL: http://www.fema.gov/hazards/earthquakes/quake.shtm

[30] Utah Geological Survey, Public Information Series 38, 996; University of Utah Seismograph Stations, unpublished data, 1996

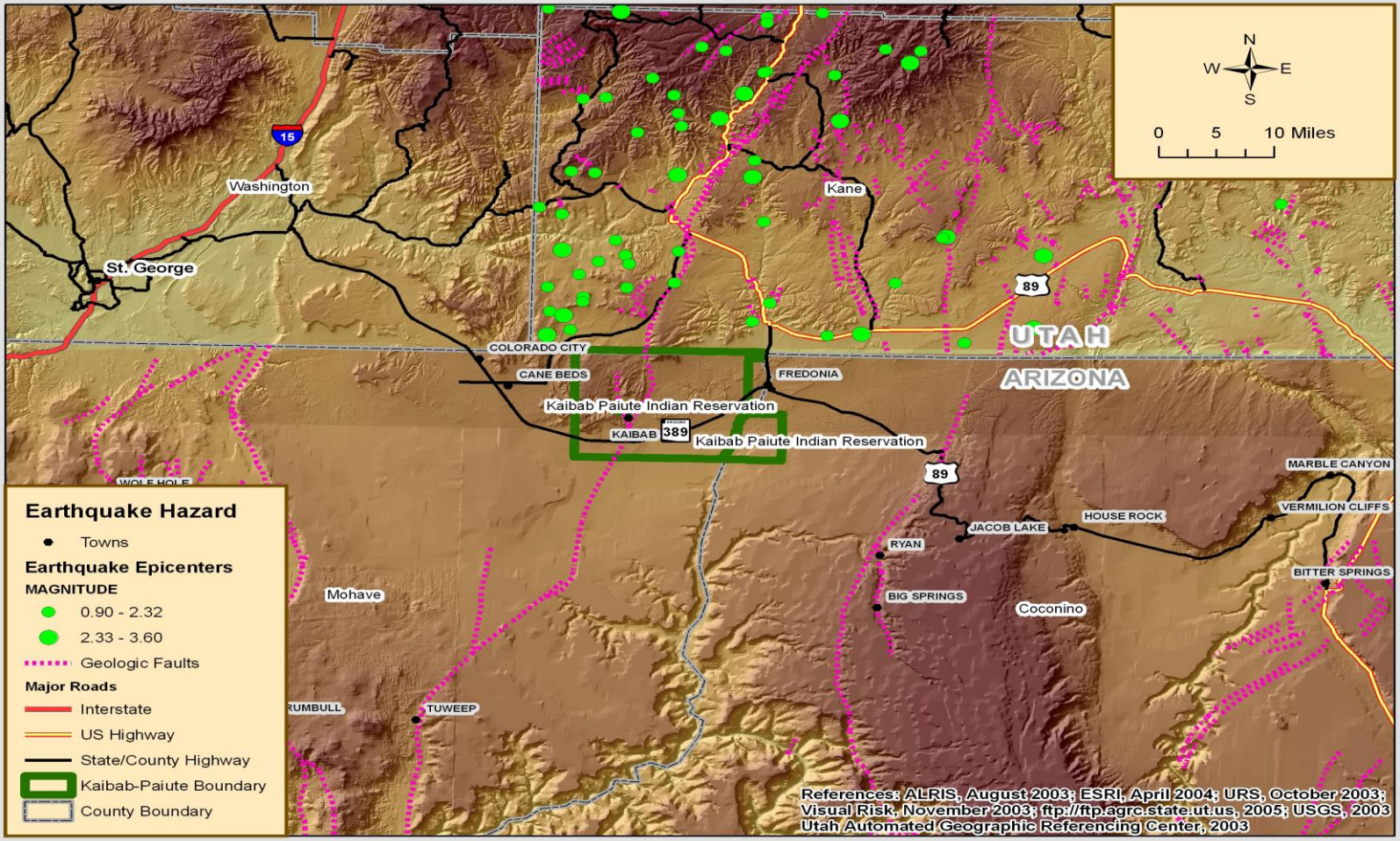

Figure 3-3

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Flooding/Flash Flooding/Tropical Storms

Flooding or flood related events are a significant hazard impacting the Tribe. Damaging floods on the Reservation can be primarily categorized as local area sheet flooding. The area of primary concern for flooding is Kaibab Village. This Village receives water drainage of the watershed areas from the southwest hills and flows eastward in and around Kaibab Village. Local area flooding is often the result of poorly designed or planned development wherein natural flowpaths are altered or obliterated and localized flooding problems result. The following are highlights of the more prominent events impacting the KPIT and surrounding areas:

- In 1963, severe flooding/flash flooding occurred on the reservation.
- In 1971, severe flooding/flash flooding occurred on the reservation.
- In 1977, tropical storm DOREEN brought heavy local thunderstorms flooding low-lying areas of Yuma, Mohave and Gila Counties. Funds of $40,000 were allocated for Bullhead City, which suffered flood and mud damage.
- In 1976, a second devastating storm bringing additional rain caused more damage to Bullhead City. Eight people had to be rescued.
- In 1981, massive flash flooding resulting from very heavy rains caused $250,000 in damage. Roads, streets, water and sewer lines were destroyed and basements filled with water and mud. Ravines three to six feet deep were cut into the streets. The large hail that preceded the heavy rain accumulated to a depth of one inch and severely damaged crops.
- In 1997, there was one fatality, 4 injuries, and $100,000 in property damage. Severe thunderstorms with very heavy rain began over central Mohave County around 12:30 am and ended around 2:30 am MST. Washes rapidly filled in the vicinity of Kingman and several roads were washed out. At least two cars were caught in a flooded wash and their four occupants had to be rescued by helicopter. Also, one woman was found dead hours later in a sewer drainage pond. It is unknown how she was caught in the flood waters. Another serious result occurred a few hours after the storms ended when a passenger train derailed while crossing a small bridge damaged and weakened by flood waters. Of the 302 passengers and crew members aboard, 116 were injured and of those eight sustained serious injuries.
- In 2005, severe flooding/flash flooding occurred on the reservation.

For the purposes of this plan, the depiction and severity of flood hazards for the Reservation are primarily based on estimated delineations of known flood hazard areas by the Planning Team. Currently, the Tribe does not participate in the National Flood Insurance Program (NFIP), which is administered by the Federal Emergency Management Agency (FEMA). Otherwise, the mapped floodplains would represent areas with a 1% probability of being flooded at a depth of one-foot or greater in any given year (otherwise referred to as 100-year). All other significant areas of flooding with lesser depths or longer recurrence intervals would be assigned a "medium" flood hazard ranking and would be equivalent to FEMA's "B" or "Shaded X" zones. In general, the "medium" zones would represent areas with a 0.2% probability of being flooded at a depth of one-foot or greater in any given year (otherwise referred to as 500-year). For the purposes of this multi-hazard mitigation plan, the sheet flow flood areas are assigned as "high" hazard area. The figure that follows is a map of the Reservation with the delineated "high" flood hazard areas shown as determined by the Planning Team. Other flood hazard areas may exist, but have not been officially identified as of the date of this plan.

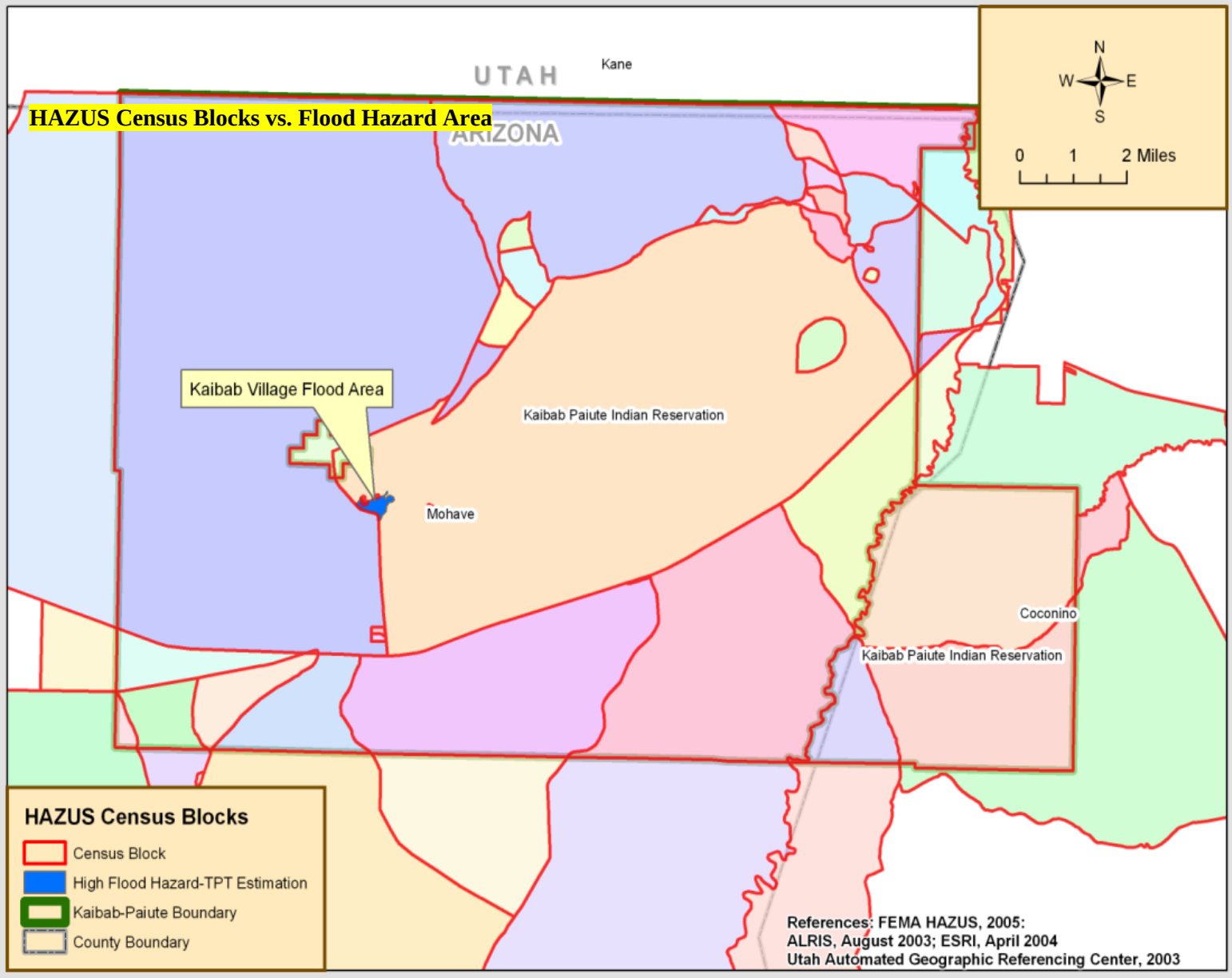
The estimation of potential exposure to 100-year flooding was accomplished by intersecting the human and facility assets with the floodplain limits shown on below. Loss estimates to all facilities located within the Planning Team high hazard floodplain were made using the loss estimation tables published by FEMA[31] as a basis. Most of the assets located within high hazard flood areas will be subject to three feet or less of flooding. Using the FEMA tables, it is assumed that all specifically identified assets located within the high hazard areas will have loss-to-exposure ratio of 0.20 (or 20%). A loss to exposure ratio of 0.05 (5%) is assumed for the HAZUS exposure data to account for the spatial variability of those data sets with the identified floodplain hazards. Normally, using a ratio to calculate the losses based on the geographic area covered of the hazard area and census block create a good representation of the losses. But since the flood hazard area is so small in relation to the large census block, this method does not fully reflect reality, especially in a rural environment such as KPIT. Therefore, the Planning Team determined to provide actual numbers in comparison with HAZUS data, represented with an asterisk in following tables.

In summary, $215,000 in flood losses to Planning Team identified assets are estimated for the Tribe. An additional, $210,000 in damages are estimated using the HAZUS data for general residential, commercial and industrial sectors. Assuming no overlap between the HAZUS data set and the asset inventory, a total of potential loss exposure of $415,000 is estimated for flood losses. This amount seems reasonable, especially when compared to historic flooding damages experienced during major storms. Regarding human vulnerability, a total population of 80 persons, or 40.81% of the total KPIT population, is potentially exposed to 100-year flood hazards. Given the historic record, it is feasible to assume that at least one death and/or injury is plausible. It is very likely, that with a significant flood, the entire population of 80 people within Kaibab Village could be displaced for a period of time as discussed by the Planning Team.

Development Trend Analysis

Most of the significant flood hazard areas within the Reservation are already delineated by the Tribal Planning Team for Kaibab Village. If any new development should occur within the residential and community areas, this should be designed to address local drainage conditions.

[31] FEMA, 2001, *Understanding Your Risks; Identifying Hazards and Estimating Losses*, FEMA Document No. 386-2.


HAZUS Census Blocks vs. Flood Hazard Area
UTAH
Kane
ARIZONA
N
W
E
S
0
1
2 Miles
Kaibab Village Flood Area
Kaibab Paiute Indian Reservation
Mohave
Coconino
Kaibab Paiute Indian Reservation
HAZUS Census Blocks
Census Block
High Flood Hazard-TPT Estimation
Kaibab-Paiute Boundary
County Boundary
References: FEMA HAZUS, 2005:
ALRIS, August 2003; ESRI, April 2004
Utah Automated Geographic Referencing Center, 2003

Asset Inventory Loss Estimates Due to Flooding						
Impacted Facilities	Impacted Facility Percentages	Estimated Replacement Cost (x $1,000)	Potential Economic Loss ($1,000)	Estimated Structure Loss ($1,000)	Estimated Economic Loss (x $1,000)	Total Loss Estimate ($1,000)
2	100.00%	$1,073	$0	$215	$0	$215

Population Sectors Exposed to Flooding								
Population						Income		
Total	Exposed	Percent Exposed	Total Over 65	Over 65 Exposed	Percent Over 65 Exposed	Total Under $20K	Under $20K Exposed	Percent Under $20K Exposed
196	1	0.26%	6	0	0.25%	28	0	0.27%
196	80	40.81%	-	-	-	-	-	-

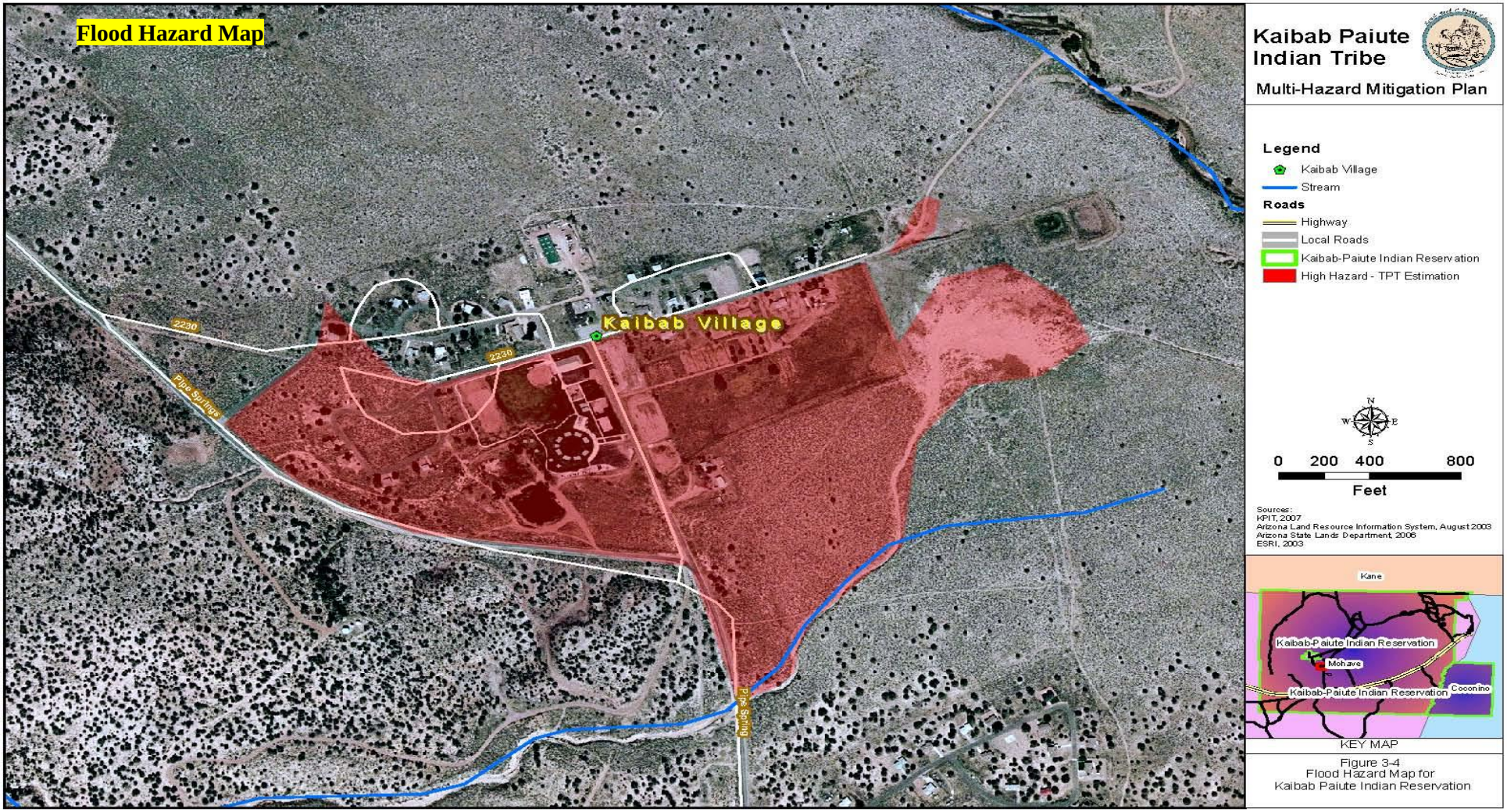


Figure 3-4
Flood Hazard Map for
Kaibab Paiute Indian Reservation

Hazardous Materials Incidents

The threat of exposure to Hazardous Materials (HAZMAT) in modern society is prevalent nationwide and throughout the Nation. HAZMAT incidents can occur from either point source spills or from transportation related accidents. The Planning Team chose to focus only on those HAZMAT facilities and chemicals that are classified by the Environmental Protection Agency (EPA) as extremely hazardous substances (EHS). In the discussion with the Planning Team, typical EHS materials such as chlorine gas, sulphuric acid, and hydrogen fluoride are non-existent on the Reservation. The Planning Team identified only major transportation corridors as part of the hazard profiling. The transportation corridors where EHS materials are known to be transported on a somewhat regular basis are illustrated below. The following are hazmat incidents that have occurred near surrounding communities:

- In 2002, a caller reports that hidden dangerous goods were discovered leaking as it was off-loaded from an aircraft. The aircraft was located in Lake Havasu Airport causing 1 injury and a cost $175.

Risk of exposure to an EHS related HAZMAT incident is separated into two categories: high and medium hazard. The Planning Team chose to estimate high hazard exposure areas by assuming a one-mile radius or offset impact zone around each hazard facility or roadway transportation corridor. Similarly, a two-mile impact zone radius or offset was used for the medium hazard exposure on each hazard facility or roadway transportation corridor.

The estimation of potential exposure to a hazardous material incident involving extremely hazardous substances (EHS) is accomplished by intersecting the human and facility assets with the point source and transportation corridor hazard areas. Exposure estimates are separated into high and medium categories that correspond to the one and two mile buffer zones. Property damages due to EHS incidents are usually minor and primarily focus on clean-up and decontamination. No readily available information exists for estimating loss-to-exposure ratios; therefore it is conservatively estimated that no more than 0.01% (or 0.0001) of the exposed property values will be realized in actual property loss exposure.

In summary, no losses in EHS incident related property losses to Planning Team identified assets are estimated for the Tribe. An additionally, no losses in damages are estimated using the HAZUS data for general residential, commercial and industrial sectors. Assuming no overlap between the HAZUS data set and the asset inventory, a total potential loss exposure of no losses is estimated for the point source and transportation corridor EHS incidents. It is recognized that EHS incidents typically occur in a single localized area and likely will not impact the entire reservation at one time. However, these numbers are representative of a collective reservation-wide exposure.

The primary concern with EHS incidents is the human exposure. For the KPIT Tribe, a total population of 41 and 56 people, or 20.71% and 28.70% of the total KPIT population, are potentially exposed to a transportation corridor EHS incidents within the, one-mile buffer and two-mile buffer zones, respectively. The potential for deaths and injuries are directly related to many factors including the type of chemical spilled, the prevailing wind pattern and speed, air temperature, humidity, and the emergency response time. Historically, for the KPIT, there are no recorded deaths and no recorded injuries related to EHS incidents. Accordingly, the potential for death and injury is moderate given a large enough incident. For any incident, displacement of people for at least one or more days is highly probable.

Development Trend Analysis

The Reservation's location along one primary state highway 389 makes it difficult to mitigate against HAZMAT related incidents. Enforcement of transport, handling, and storage regulations will continue to be the most effective form of mitigation. Due to the remote nature and limited access to most of the uranium claims in the region, several hundreds of claims (and to the best of KPIT knowledge, all of the mines expected to begin production this year) will require transport through the Kaibab Paiute Indian Reservation. Any mine on the Arizona Strip located west of Kanab Creek, will funnel onto the unpaved Mount Trumbull road, crossing through the reservation to intersect with Highway 389. From Highway 389 to Fredonia, the route to the nearest uranium mill continues to cross the reservation. Denison (the owner of the mines scheduled to begin production) claims that the typical life cycle of an Arizona Strip mine is approximately eight years. Based on one mine's plan, each mine will average about 12 semi trips per day on the rural highway. This number, multiplied by the number of mines that may come into production (at least 4 mines plan to start up this year) means at least 50 extra semi trucks and associated worker traffic for each mine per day. As such, KPIT tribal citizens face an elevated risk from the transport of uranium-bearing ores and heavy truck traffic. KPIT has passed a tribal resolution against uranium mining.

Although a judge recently blocked the exploration of a mine on the South Rim of Grand Canyon with a temporary restraining order based on an alleged flaw in the permitting process used by the U.S. Forest Service, that decision will not affect the mines previously been permitted and are now being re-opened.

Asset Inventory Loss Estimates due to Potential Point Source and Transportation Corridor EHS Incidents

Impacted Facilities	Impacted Facility Percentages	Estimated Replacement Cost (x$1,000)	Potential Economic Loss (x$1,000)	Estimated Structure Loss (x$1,000)	Estimated Economic Loss (x$1,000)	Total Loss Estimate (x$1,000)
8	100.00%	$4,588	$0	$0	$0	$0
4	100.00%	$689	$0	$0	$0	$0

Population Sectors Potentially Exposed to Point Source and Transportation Corridor EHS Incidents

Population						Income		
Total	Exposed	Percent Exposed	Total Over 65	Over 65 Exposed	Percent Over 65 Exposed	Total Under $20K	Under $20K Exposed	Percent Under $20K Exposed
196	41	20.71%	6	1	20.02%	28	6	21.45%
196	56	28.70%	6	2	34.51%	28	8	29.86%

Hazardous Materials Hazard Area Map as

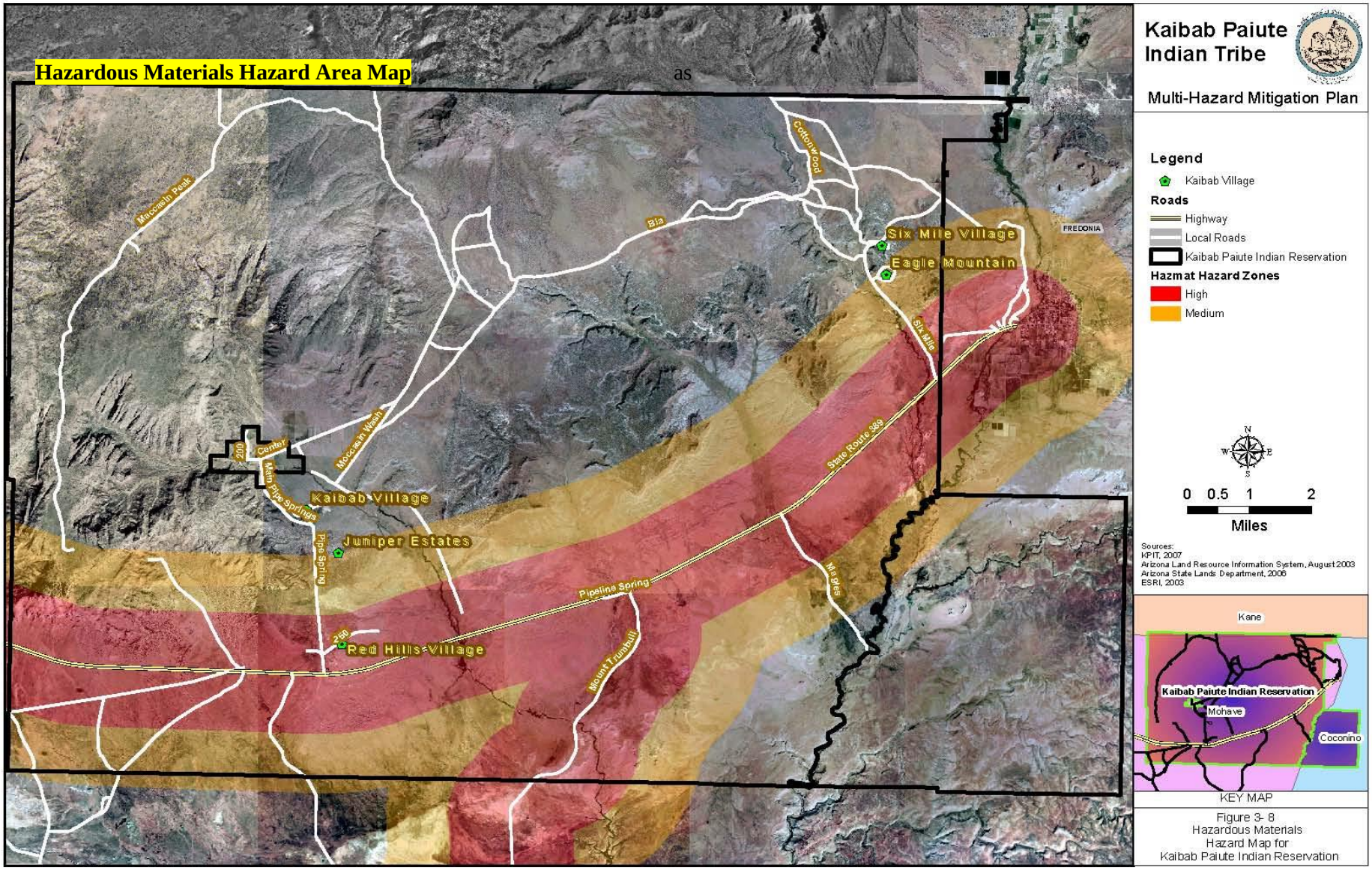


Figure 3- 8
Hazardous Materials
Hazard Map for
Kaibab Paiute Indian Reservation

Landslides/Mudslides

Landslides, like avalanches, are massive downward and outward movements of slope-forming materials. The term landslide is restricted to movement of rock and soil and includes a broad range of velocities. Slow movements, although rarely a threat to life, can destroy buildings or break buried utility lines. A landslide occurs when a portion of a hill slope becomes too weak to support its own weight. The weakness is generally initiated when rainfall or some other source of water increases the water content of the slope, reducing the shear strength of the materials. A mud slide is a type of landslide referred to as a flow. Flows are landslides that behave like fluids: mud flows involve wet mud and debris.

The State of Arizona developed landslide susceptibility hazard zones in the All-Hazard Mitigation Plan (State of Arizona Plan). Only one significant landslide event in Arizona was identified which consisted of no fatalities, injuries or damages.

- In December 1995, a massive landslide blocked the Moenkopi Wash near Tuba City in Coconino County. This created an unstable damming of the stream flow which would result in imminent threat of flash flooding impacting downstream communities.

The map below utilizes data from a study by USGS called "Landslide Overview of the Conterminous United States (1997)" which contains mapping of landslide susceptibility. The map was prepared by identifying individual or groups of formations and classifying them as high, medium, or low susceptibility.

Excerpt: "This map builds on a previous landslide incidence map, with the assumption that anomalous precipitation or changes in the existing conditions could initiate movement in rocks and soils that have numerous landslides incidence in parts of their outcrop areas."[32]

The author of the study acknowledges the categories are very subjective due to lack of data. Due to the high generalized nature of the map, it is not necessarily suitable for local planning. For the purpose of this Multi-Hazard Mitigation, the possibilities of landslides/mudslides that may impact the Reservation, will be recognized and considered.

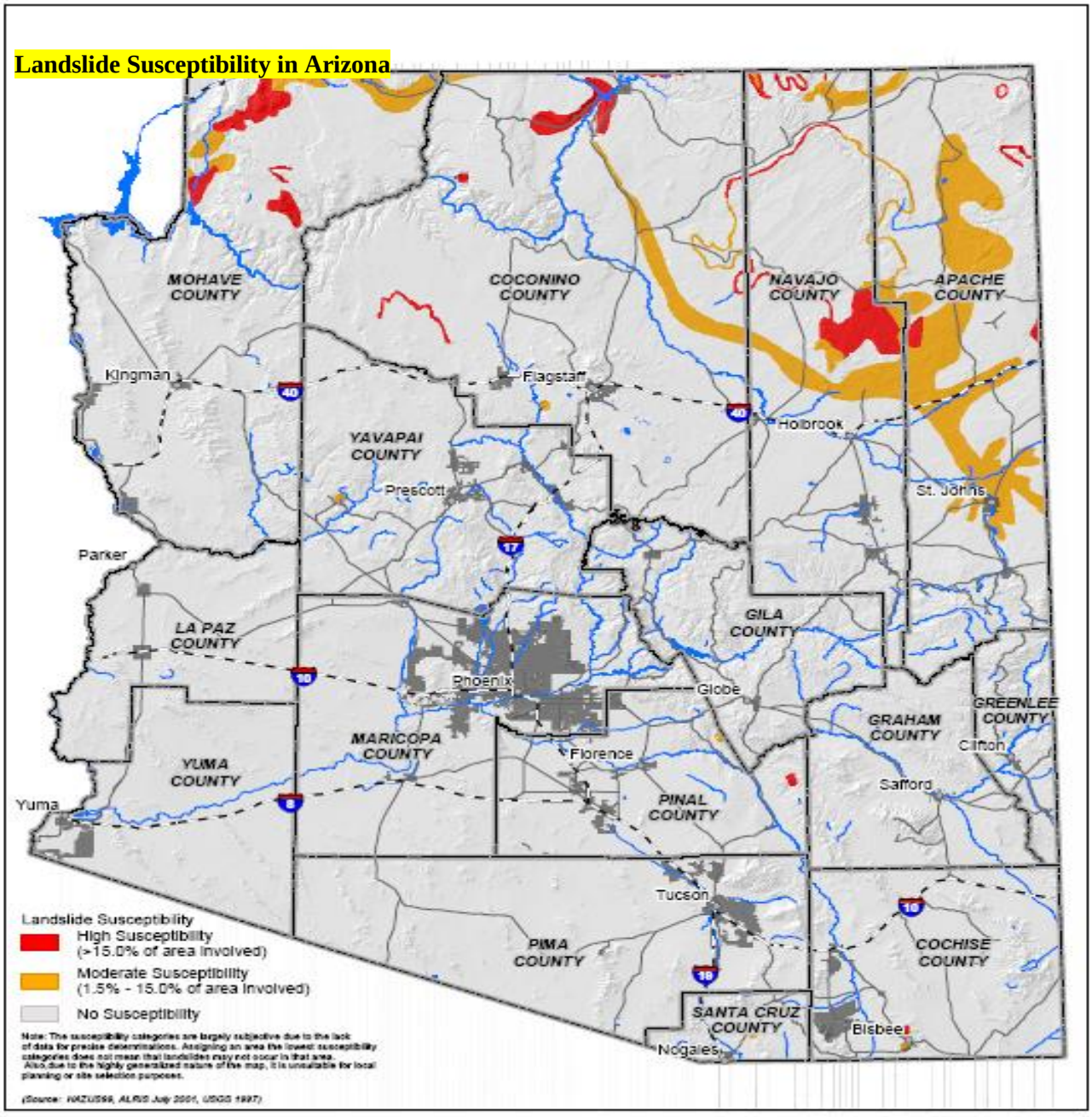
Development Trend Analysis

If development should occur, alternate sites should be considered if area is recognizable as potential hazard including alluvial fan sites.

Rock Slides in Steamboat?? Concern?

[32] Except from URS Corporation, 2004, *State of Arizona All Hazard Mitigation Plan*

Landslide Susceptibility in Arizona



Thunderstorms/High Winds

Thunderstorms, high winds and related events are significant hazards impacting the KPIT and surrounding communities. Hazards most typically associated with thunderstorms include lightning, microbursts, hail, dust and sand storms, and flooding. Other high wind related events such as tornadoes could also pose a hazard to the KPIT population and critical facilities. Flooding hazards have been discussed in the previous section. Thunderstorms can occur at any time throughout the year, but are most common during the summer Monsoon season of July to September.

The National Weather Service (NWS) characterizes severe thunderstorms as those with one or more of the following criteria:

- Wind speeds exceeding 58 mph
- Production of a tornado
- Hail at least 0.75 inches in diameter.

Severe thunderstorms are also occasionally accompanied by downbursts and microbursts, which are strong, straight-line winds created by falling rain. Downbursts may reach speeds of 125 mph. Microbursts are less than 2.5 square miles in diameter with speeds reaching up to 150 mph. Both downbursts and microbursts typically last less than 10 minutes, but can cause severe damage and pose a major hazard to aircraft departures/landings due to the wind shear and detection difficulties, and structures due to the high intensity forces. .

The following are highlights of the more prominent non-flood related thunderstorm events impacting the KPIT and neighboring communities:

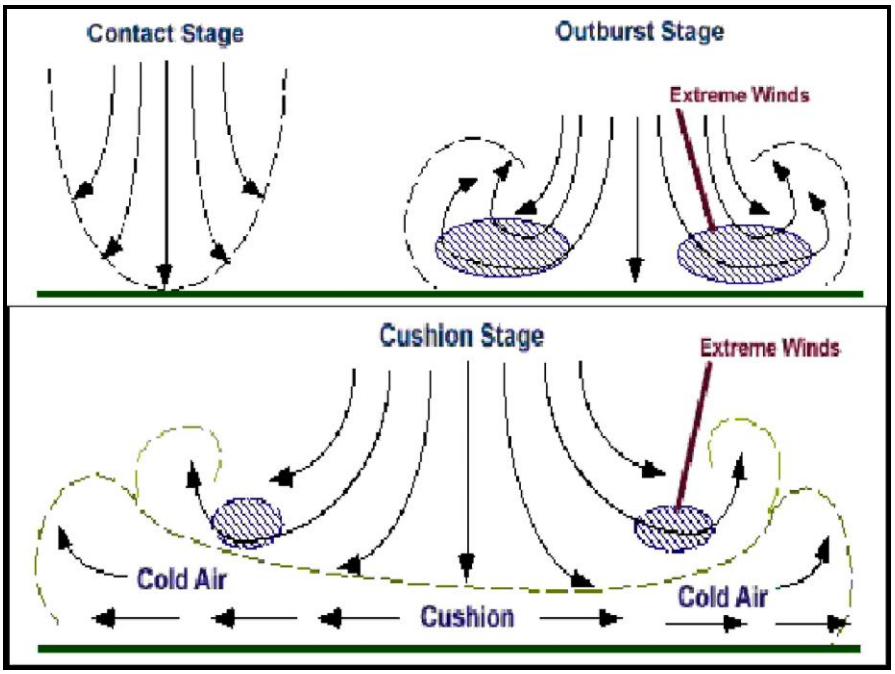
- In May 1956, thunderstorm and high winds impacted the Reservation.
- In 1998, damaging thunderstorm winds downed power lines as they blew through Colorado City.
- In 1998, a large window (14' by 6') was blown out at a restaurant, causing minor cuts and injuries to seven people. The damaging winds also ripped off two balcony roofs from another resort building and sank a boat at a nearby dock.
- In 1997, damaging winds ripped part of a roof off a house, downed several trees and knocked over a fence. Although the exact time was not known, a Skyward Spotter also recorded a 75 mph thunderstorm gust that occurred sometime between 5:30 and 8:00 pm MST. Other events that occurred between 6 and 8 pm MST included power outages, a roof blown off a fitness center, apartment parking awnings mangled and street signs blown over and bent.
- In 1995, a very strong thunderstorm caused damage to more than 250 homes, several extensively. Roofs were ripped off and air conditioners at three homes were blown to the ground. Winds overturned some boats with a few of them crashing into the street. Winds also knocked down powerlines. Torrential rains caused washes to run very high.

The entire reservation is assumed to be equally exposed to the damage risks associated with the non-flood hazards related to thunderstorms or other high wind events. Typically, incidents are fairly localized and damages associated with individual events are relatively small. According to the National Weather Service, the Tribe typically endures an average of 60 thunderstorm events per year. It is realistic to expect that at least 10% of the thunderstorms impacting the Tribe could be categorized as severe, meaning they could have a potential for wind gusts in excess of 58 mph and hail in excess of 0.75 inches. Assuming that on average, each severe storm has a potential to cause at least $10,000

of damage, then a possible annual loss exposure of $60,000 can be estimated. Given the historic record, these estimates seem reasonable. Historically, no fatalities and few injuries have resulted from thunderstorm related events; however, it is feasible to assume that multiple injuries and at least one death are plausible.

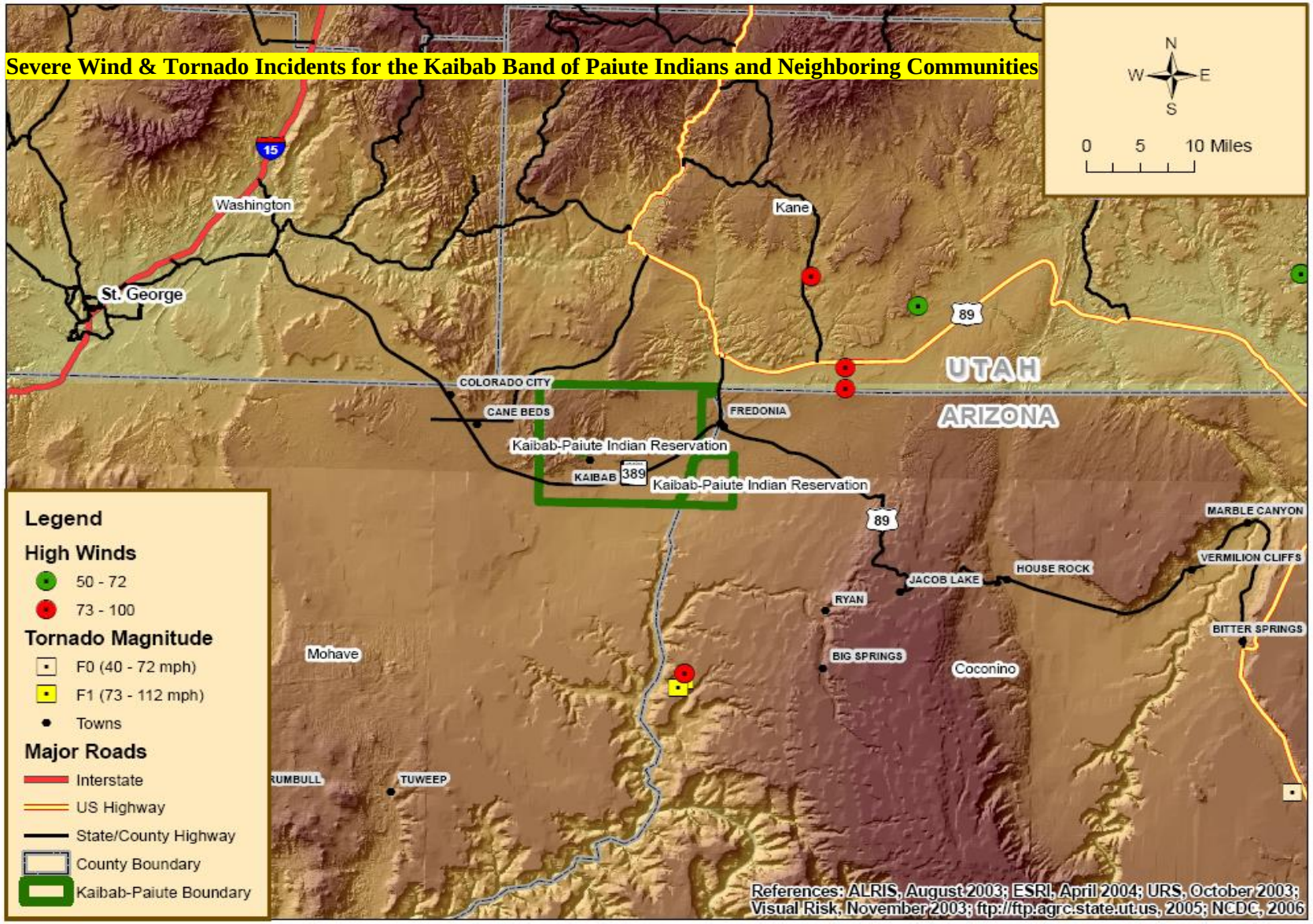
Development Trend Analysis

Existing and new development should continue to be designed to meet the minimum wind loading requirements per standard building codes. Ancillary structures such as sheds or awnings, should be secured to withstand mobilization by high winds.



Evolution of a Microburst[33]

[33] University of Illinois Urbana-Champaign, Department of Atmospheric Sciences, 2005, Web link at: http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/svr/comp/out/micro/home.rxml.


Severe Wind & Tornado Incidents for the Kaibab Band of Paiute Indians and Neighboring Communities
N
W
E
S
0 5 10 Miles
15
Washington
St. George
Kane
89
UTAH
ARIZONA
COLORADO CITY
CANE BEDS
FREDONIA
Kaibab-Paiute Indian Reservation
KAIBAB
389
Kaibab-Paiute Indian Reservation
89
MARBLE CANYON
VERMILION CLIFFS
HOUSE ROCK
JACOB LAKE
RYAN
BITTER SPRINGS
BIG SPRINGS
Coconino
Mohave
RUMBULL
TUWEEP
Legend
High Winds
50 - 72
73 - 100
Tornado Magnitude
F0 (40 - 72 mph)
F1 (73 - 112 mph)
Towns
Major Roads
Interstate
US Highway
State/County Highway
County Boundary
Kaibab-Paiute Boundary
References: ALRIS, August 2003; ESRI, April 2004; URS, October 2003; Visual Risk, November 2003; ftp://ftp.agrc.state.ut.us, 2005; NCDC, 2006

Transportation Accident

A transportation accident is an incident related to a mode of transportation (highway, air, rail, waterway, port, harbor) where an emergency response is necessary to protect life and property. Many transportation accidents have occurred in Mohave County and the most significant incidents that have resulted in injuries or fatalities occur on State and County highways including Highway 389 and Mount Trumbull Road that traverses Kaibab Paiute Indian Reservation. With the development of a new mine south on Mount Trumbull, concern for accidents continues to escalate along these two highways. Road accidents aren't the only transportation incidents, and a military aircraft has crashed onto the Reservation in the past, as well. The following are transportation accidents that have occurred on the KPIT Reservation or near surrounding communities:

- A military aircraft crashed onto the Reservation on July 27, 1997, an airplane crashed into the Colorado River releasing an unknown amount of fuel.

Potential losses and damages due to major transportation accidents are difficult to estimate and will not be attempted within this plan. Instead, exposure of human and facility assets is estimated based on potential hazmat incident. On the KPIT Reservation, the two primary categories of accident potential are either ground based or air based. Ground based incidents include vehicular accidents. Air based incidents involve the failure of aircraft flights. For both types of incidents, it is reasonable to project that the entire reservation and community assets and population are potentially exposed to an accident in one form or another.

High risk ground based areas include State Route 389. The higher speeds and greater numbers of vehicles along this corridor combine to create an increased risk for major accidents. Since State Route 389 is the only road available for ingress and egress access to the major population of the tribe, it is of great concern to the well-being of the tribal members for alternate emergency road access during a shut-down of State Route 389. When this route is shut-down, the tribal members do not have access to the reservation, except for alternate non-maintained roads which would be detrimental during an emergency. It is interesting to note that most number of crashes resulting in fatalities occur on the State and Other Rural Roads. This is likely due to the higher rates of speed and increased potential for multiple vehicle accidents. As a Planning Team, it is reasonable to estimate one death and multiple injuries within Kaibab Paiute Indian Reservation. Additional deaths or injuries is possible within the Reservation if the State Route 389 is shut down for a period of time for tribal members seeking medical attention for non-transportation accidents, since this is the only route in and out of the area.

Development Trend Analysis

With the highway running the length of the Reservation, enforcement of speed limits and possible traffic control devices along the highway would reduce accidents.

2005 Crash Statistics for Mohave County

	Total	Number of Crashes			No. of Persons		Alcohol Related		
Jurisdictions		**Fatal**	**Injury**	**PDO**	**Killed**	**Injured**	**Crashes**	**Killed**	**Injured**
Mohave County	455	6	165	284	7	223	41	3	31
Mohave Co State Rural Roads	846	35	329	482	43	595	63	8	66
Kingman	667	1	239	427	1	387	28	0	28
Lake Havasu City	748	3	258	487	3	377	57	1	34

Bullhead City	1,001	7	301	693	8	431	77	2	48
Colorado City	16	0	5	11	0	6	1	0	0
TOTAL	**3,733**	**52**	**1,297**	**2,384**	**62**	**2,019**	**267**	**14**	**207**

Wildfire

Wildfire is a rapid, persistent chemical reaction that releases heat and light, especially the exothermic combination of a combustible substance with oxygen. Wildfires present a significant potential for disaster in the southwest, a region of relatively high temperatures, low humidity, low precipitation, and during the spring moderately strong daytime winds. Combine these severe burning conditions with people or lightning and the stage is set for the occurrence of large, destructive wildfires.[34]

The factors that influence the spread of wildfire include fuel type, fuel moisture, wind, weather, topography, and response capabilities. Only fuel and response can be managed to reduce the intensity and spread of wildfire. The forested regions of the area around and within the Reservation offer significant sources of fuel and topography favorable to wildfire. The intersection of environmental and economic sectors versus historically natural fire patterns and seasons, has left much of the forested areas in a prime condition to experience extremely destructive fires. In addition, overlap hazards such as bark beetle infestations and extended severe drought conditions exacerbate the wildfire hazard. The State of Arizona has developed wildfire hazard areas in the All-Hazard Mitigation Plan[35] (State of Arizona Plan). The wildfire risk profile map for the entire State of Arizona was prepared using the guidelines outlined by the International Fire Code Institute (IFCI) in the *Urban-Wildland Fire Interface Code 2000.* Gross scale mapping of vegetation types, topography, and other factors required by the IFCI methodology were obtained and compiled by the State to estimate wildfire risk, with hazard categories ranging from extreme to barren. The profile map coverage even identifies agricultural lands and urbanized areas as separate hazard zones. Excerpts from the State of Arizona Plan detailing the development of the wildfire risk mapping are provided in Appendix E for reference.

Based on a review and evaluation of the data presented in the State of Arizona Plan, the Planning Team chose to classify the wildfire risk for the entire Reservation as high and medium. According to the State of Arizona Multi-Hazard Mitigation Plan, the majority of the KPIT Reservation is characterized by areas of light to medium density vegetation. Also, based on the State Plan extreme wildfire hazard areas exist to the north and to the northeast areas on the Reservation, and the remaining portions were identified as a medium hazard. Several committee members were concerned with the ranking, noting that a "Medium Fire Hazard" doesn't adequately represent the actual conditions of the area. The Planning Team indicated that cheat grass that has been invading the area, is a flashy fuel that is easy to ignite, and will burn hot and fast when cured. Due to this fuel being heavy along the roadway, this could be a catalyst for fires starting and getting into the thicker Pinyon and Juniper stands along the road and around the villages. Therefore, Planning Team wanted to identify and recognize wildfire high hazard areas around the Kaibab and Juniper Villages and along Pipe Springs Road. These areas are delineated with one-half mile buffer zones and represented as "High Wildland Fire Hazard" area. Also, drainage areas and washes which are identified by using a 100 foot buffer along these corridors are also recognized as "High". Fires burning through the heavily vegetated floodplain areas can be very difficult to fight, especially in areas where water is not readily available. Figure 3-7 depicts the historical fires, and wildfire hazard zones developed by the Planning Team.

The following are highlights of the more prominent wildfire events impacting the KPIT:

[34] Arizona Model Local Hazard Mitigation Plan

[35] URS Corporation, 2004, *State of Arizona All Hazard Mitigation Plan.*

- Summer of 2006, there was a wildland fire just north of Kaibab Village. The fire consumed 30 acres, and threatened Kaibab Village and the town of Moccasin. The Fire Chief was considering evacuating the houses on the northern end of the village. Total cost of the fire was $600,000.
- Summer of 2004, a wildland fire grew to about 300 acres. In this particular fire, a vehicle (tender) was destroyed, and outside resources were relied heavily upon to extinguish the fire. Although no homes were threatened, it is an indicator of the fire season to come. The total cost of the fire was $1.7 million.
- In July of 2000, a wildfire on Moccasin Mountain in the heart of the reservation burned 1,618 acres of pinyon-juniper and sagebrush, demonstrating fire behaviors that could have destroyed the Kaibab and Juniper Villages and the community of Moccasin had the wind direction shifted.

Estimates of human and asset exposure to wildfire are accomplished by intersecting the asset inventory and HAZUS data with the wildfire hazard presented previously and on Figure 3-6. Exposure to two wildfire hazard types; high and medium were estimated for each data set. Since no common methodology is available for estimating losses based on wildfire hazard exposure, estimates of the loss-to-exposure ratios were assumed based on the perceived intensity of a fire hazard. The loss-to-exposure ratios for the high and medium wildfire hazard is estimated to be 0.2 and 0.05, respectively.

In summary, $1.7 million in wildfire losses to Planning Team identified assets are estimated for the Tribe. An additional $1.2 million in damages is estimated using the HAZUS data for general residential, commercial and industrial sectors. Assuming no overlap between the HAZUS data set and the asset inventory, a total of potential loss exposure of $2.9 million is estimated for wildfire losses. It is unlikely that any wildfire would burn across the entire Reservation in a given event, and the incident specific damage costs are likely to be only a fraction of those presented. However, as a collective evaluation, the loss estimate seems reasonable. Regarding human vulnerability, 100% of the total KPIT population is potentially exposed to at least a medium wildfire hazard. Typically, deaths and injuries not related to firefighting activities are rare. However, it is feasible to assume that at least one death and/or injury is plausible. There is also a high probability of some population displacement during a wildfire event, and especially in the urban wildland interface areas.

Development Trend Analysis

Wildfire hazards along the WUI pose one of the most significant hazards to the KPIT facilities and structures. Thinning activities and the creation of firebreaks along the perimeter areas should be continued to prevent wildfires from burning through the Reservation.

Assets Exposed to Wildfire						
Impacted Facilities	**Impacted Facility Percentages**	**Estimated Replacement Cost (x$1,000)**	**Potential Economic Loss (x$1,000)**	**Estimated Structure Loss (x$1,000)**	**Estimated Economic Loss (x$1,000)**	**Total Loss Estimate (x$1,000)**
17	100%	$8,911	$0	$1,782	$0	$1,782
4	100%	$150	$0	$7	$0	$7

Population Sectors Exposed to Wildfire								
Population						Income		
Total	Exposed	Percent Exposed	Total Over 65	Over 65 Exposed	Percent Over 65 Exposed	Total Under $20K	Under $20K Exposed	Percent Under $20K Exposed
196	54	27.52%	6	2	27.14%	28	8	27.39%
196	142	72.48%	6	4	72.86%	28	20	72.61%

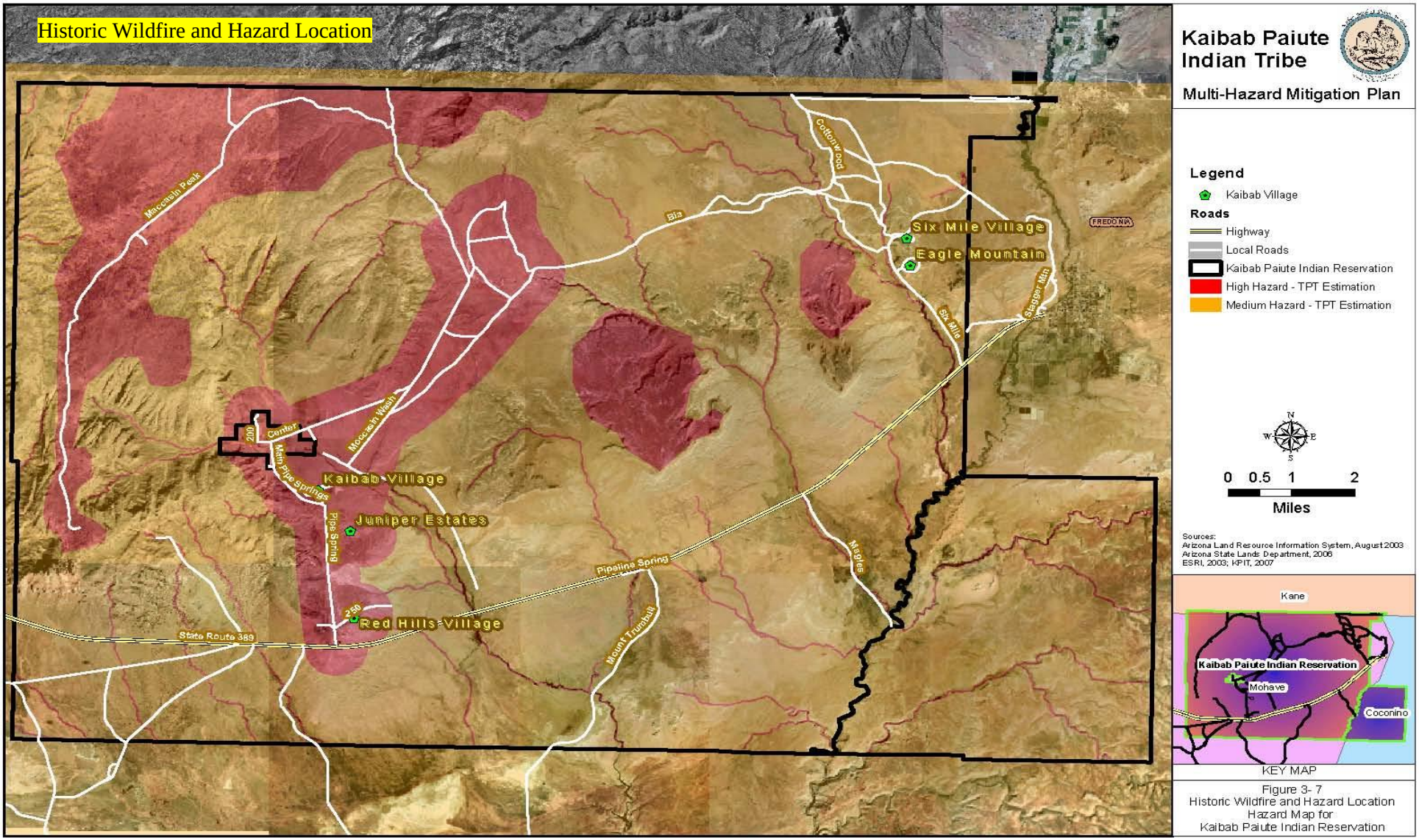


Figure 3- 7
Historic Wildfire and Hazard Location
Hazard Map for
Kaibab Paiute Indian Reservation

SECTION 5: MITIGATION STRATEGY

Section Changes

Discontinued the use of the STAPLEE method to prioritize this Plan's actions and projects as it is time consuming to arrive at results that were already determined and known.

Goals and Objective(s) were reformulated to put the Tribe's interest in more simple and manageable terms.

The following section summarizes the strategy developed by the Tribe for mitigating the hazard risks identified and summarized in Section 3. The mitigation strategy provides the "*what, when, and how*" of actions that will reduce or possibly remove the community's exposure to hazard risks. According to DMA2K, the primary components of the mitigation strategy are generally categorized into the following components:

4.1 Capability Assessment

Requirement: 201.7(c)(3)(iv): The mitigation strategy shall include a discussion of the Indian Tribal government's pre- and post-disaster hazard management policies.

- An evaluation of tribal laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard prone areas; and

- A discussion of tribal funding capabilities for hazard mitigation projects.

Requirement: 201.7(c)(3)(v): The mitigation strategy shall include an identification of current and potential sources of Federal, tribal, or private funding to implement mitigation activities.

A formal capability assessment provides information that is helpful to assessing the Tribe's ability to mitigate against hazards. The Planning Team reviewed and evaluated the Tribe's resources and capabilities in the following general areas:

- **Legal/Regulatory, Codes, and Ordinances**
- **Technical/Staff Resources**
- **Financial Resources**

These capabilities and resources are summarized in the following tables.

Regulatory Tools (Ordinances, Codes, and Plans)	Local Authority (Y/N)	Comments
Building Code	Yes	
Zoning Ordinance	Yes	
Subdivision Ordinance or Regulations	Yes	
Special Purpose Ordinances	No	
Growth Management Ordinances	No	

Regulatory Tools (Ordinances, Codes, and Plans)	Local Authority (Y/N)	Comments
Site Plan Review Requirements	No	
General or Comprehensive Plan	Yes	Through ordinances and resolutions passed by the Tribal government.
Capital Improvements Plan	No	
Economic Development Plan	Yes	
Emergency Response Plan	No	
Post-Disaster Recovery Plan	No	
Post-Disaster Recovery Ordinance	No	
Real Estate Disclosure Statement	No	

Staff/Personnel Resources	Department/Agency - Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Most of this type of work is sub-contracted out to planners and/or engineers.
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Housing Director / Facility Maintenance Director
Personnel skilled in GIS and/or HAZUS	Environmental Department and Housing Department
Scientists familiar with the hazards of the community	Environmental Director
Emergency Manager	Fire Department Chief
Grant writer(s)	The Tribe has several staff members who are familiar with writing grants. The Tribe is in the process of hiring a Grant Writer.
Planner(s) or engineer(s) with and understanding of natural and/or human-caused hazards	
Floodplain Manager	
Surveyors	
Staff with education or expertise to assess the community's vulnerability to hazards	

Financial Resources	Accessible or Eligible to Use
Community Development Block Grants	Yes
Capital Improvements Project funding	Yes, but little known about the project
Authority to levy taxes for specific purposes	Yes
Fees for water, sewer, gas, or electric service	Yes to all
Impact fees for homebuyers or new developments/homes	No
Incur debt through general obligation bonds	Don't Know
Incur debt through special tax bonds	Don't Know
Incur debt through private activity bonds	Don't Know
Withhold spending in hazard-prone areas	Don't Know

Current pre- and post-disaster hazard management is accomplished through several KPIT departments with assistance from some federal agencies. The following table summarizes some of the KPIT departments and programs involved in either pre- or post-disaster hazard management.

Pre- and/or Post-disaster Hazard Management Responsibilities	
Department or Agency	**Hazard Management Activities**
Tribal Council	• Will make all executive decisions concerning pre- and post-disaster hazard management decision.
Tribal Emergency Response Commission	• Coordinate emergency response activities.
Tribal Administration	• Will make all executive decisions after Tribal Council, and will delegate duties as needed.
Volunteer Fire Dept	• Will be called out and involved during and post-disaster.
Environmental Dept	• Will be involved in all planning processes concerning both pre- and post-disaster hazard management.
Housing / Facility Maintenance Depts	• Will be involved in all planning processes concerning both pre- and post-disaster hazard management, as they have equipment that may be needed, and access to facilities that may be needed.
Social Services	• Will be involved to help assist
Community Health Resources	• The CHR Dept will play a crucial role both pre- and post-disaster hazard management, as they will be involved in dealing with the community members, and any lingering injuries and/or illnesses if it occurs.

Upon receipt of a presidential disaster declaration, the Tribe will work with FEMA to develop two post-disaster hazard management tools: a Public Assistance Administration Plan and a Hazard Mitigation Grant Program Administration Plan. Both plans will be used by the Tribe to identify the roles and responsibilities of the Tribe in administering the FEMA Public Assistance (PA) and Hazard Mitigation Grant Programs (HMGP), and to outline staffing requirements and the policies and procedures to be used. A result of developing these plans, as well as preparing this Plan, will be to further focus Tribal resources on the importance of hazard management and mitigation planning.

Staff resources in several KPIT departments and programs, working under the auspices of the Board, collectively provide hazard mitigation for the Tribe. The KPIT often hires consultants to conduct the necessary technical studies and analyses to determine both risk and mitigation alternatives. The Tribe also actively coordinates with Colorado City, Fredonia, and Mohave County.

Current financial sources available to the Tribe for hazard mitigation planning and projects include potential disaster and mitigation funds through FEMA (Public Assistance, HMGP, and PDM funds), programs established through the Self Determination Act (Public Law 93-638), and various departmental operation budgets. Potential sources of funds are vast and may include any of the previously mentioned resources and others such as the U.S. Department of Interior (Bureau of Reclamation, Bureau of Indian Affairs, U.S. Geological Survey, Bureau of Land Management), U.S. Army Corps of Engineers, U.S. Housing and Urban Development, U.S. Department of Health and Human Services (Indian Health Service), and the U.S. Department of Agriculture (U.S. Forest Service, Natural Resources Conservation Service). The Arizona State Plan includes a comprehensive list of various funding sources and grant programs. A copy of that listing is provided in Appendix E.

In summary, Kaibab Paiute Indian Tribe currently has in place several regulatory mechanisms for mitigation of hazards, with most being directed at new construction and development. Staff resources and/or consultants are available for the identification, development and implementation of mitigation measures with some overlap of expertise in the various categories. Financially, the Tribe applies for Community Development Block Grants, obtains Capital Improvement Project funding, and has the authority to levy taxes for specific purposes. However, all of these mechanisms require political approval and are often difficult to implement.

Goals and Objectives

Requirement: 201.7(c)(3)(i): This section shall include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

4.2 Goals and Objectives

The following is a list of the KPIT goals and objectives generated by the Planning Team:

Goal 1.	**Reduce potential loss of life and property due to thunderstorms, dust storms and tornados.**
Objective 1.A	Adopt Uniform Building Code.
Objective 2.B	Adopt protective measures to ensure reduction of property damage to existing structures due to thunderstorms, dust storms and tornadoes.
Goal 2.	**Reduce potential losses of life and property due to flooding.**
Objective 2.A	Adopt protective measures to ensure reduction of property damage to existing

structures due to flooding.

Objective 2.B Coordinate with federal and state agencies.

Objective 2.C Adopt planning and zoning codes for disaster resistant developments.

Goal 3. Reduce potential loss of life and property due to drought.

Objective 3.A Develop water conservation program.

Objective 3.B Develop plans and methods to protect assets from effects of drought.

Goal 4. Reduce potential loss of life and property due to wildfire.

Objective 4.A Adopt protective measures to ensure reduction of property damage to existing structures due to wildfire.

Objective 4.B Adopt planning and zoning codes for disaster resistant developments.

Objective 4.C Develop emergency management capabilities for mitigating wildfires.

Objective 4.D Coordinate support with other agencies.

Goal 5. Reduce potential loss of life and property due to earthquake.

Objective 5.A Adopt uniform building codes for future developments.

Objective 5.B Adopt protective measure to ensure reduction of property damage to existing structures due to earthquake.

Goal 6. Promote hazard mitigation awareness and support through education and coordination.

Objective 6.A Educate community through public awareness program and workshops.

Objective 6.B Encourage community involvement on local mitigation actions.

Objective 6.C Monitor and evaluate effectiveness of community awareness and mitigation activity in community.

Objective 6.D Develop on-going program to keep community aware of mitigation opportunities and effectiveness.

Goal 7. Reduce health risks to population due to hazardous materials application.

Objective 7.A Increase community education and outreach to the public.

Objective 7.B Increase public notification response and coordination regarding emergencies.

Objective 7.C Coordinate with Federal and State Agencies.

Goal 8. Reduce the potential level of damage and losses to people and community assets due to transportation hazards.

Objective 8.A Identify and rehabilitate existing alternative roads to enable year round access to reservation.

Goal 9. Protect life, property and community assets from landslides/mudslides and other

natural hazards.

Objective 9.A Increase public awareness regarding natural hazards in the area.

Objective 9.B Adopt protective measures to ensure reduction of property damage to existing structures due to natural hazards.

Objective 9.C Adopt protective measure to ensure protection of tribal records.

4.3 Mitigation Actions/Projects

Mitigation Actions/Projects

Requirement: 201.7(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing building and infrastructure.

Mitigation actions/projects (A/P) are those activities identified by a community, that when implemented, will have the effect of reducing the community's exposure and risk to the particular hazard or hazards being mitigated. Using the results of the vulnerability analysis, the capability assessment, and the goals and objectives, the Planning Team formulated a list of A/Ps for mitigation of the identified hazards within the county. The A/Ps identified can be generally classified as either structural or non-structural. Structural A/Ps typify a traditional "bricks and mortar" approach where physical improvements are provided to effect the mitigation goals. Examples may include channels, culverts, bridges, detention basins, dams, emergency structures, and structural augmentations of existing facilities. Non-structural A/Ps deal more with policy, ordinance, and administrative changes, buy-out programs, and legislative actions.

The mitigation A/Ps developed for the Tribe include information for the following categories:

- **Identification and Description** – Each A/P is provided with a unique identifier and a description that summarizes the type, scope, and characteristics of the A/P, and the goal or goals addressed with the A/P.
- ~~**Estimated Percent of Hazard or Hazards Mitigated** – Some A/Ps are directly associated with the mitigation of at least one or more hazards, and a subjective estimate of A/P effectiveness can be made in terms of the percent of hazard(s) mitigated. This percentage is then used for estimating the Benefit/Cost (B/C) ratio for that A/P. An "N/A" is coded for the A/Ps that do not apply.~~
- ~~**Total A/P Cost** – For each A/P, a conceptual cost was estimated to assess the economic viability. For structural A/Ps, a conceptual construction cost estimate was made. For non-structural A/Ps, the cost was derived by estimating the approximate man-hour cost of staff time needed to implement the A/P.~~
- ~~**Simplified Benefit/Cost Analysis** – The simplified B/C ratio methodology outlined in the Arizona Model Local Hazard Mitigation Plan will be employed to assess the economic viability of an A/P. In cases where the application of this procedure is difficult or impractical, an arbitrary B/C ratio of 1.0 is assigned.~~

- ~~**Evaluation and Local Prioritization** – The Planning Team evaluated and ranked each A/P using the STAPLEE [36] procedure outlined in Step 2 of FEMA 386-3.~~

4.4 Implementation Strategy

Requirement: 201.7(c)(3)(iii): The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the Indian Tribal government.

The implementation strategy addresses the *"how, when, and by whom?"* questions related to implementing an identified A/P. The Planning Team developed an implementation strategy for the ranked projects in Table 4-6, by providing the following information:

- **Lead Agency** – For each A/P, a lead agency was identified. This agency will be responsible for the A/P's ultimate development and implementation.
- **Funding Source Identification** – Sources of funding for each A/P were identified.
- **Implementation Schedule** – For each A/P, an implementation schedule was developed to specify the anticipated completion dates. In the cases where the A/P completion is tied to the receipt of federal or state grant funds, the dates may be unknown.

[36] FEMA, 2003, *Developing the Mitigation Plan – Identifying Mitigation Actions and Implementation Strategies*, FEMA 386-3, pp 2-12 through 2-21 and Worksheet #4.

Mitigation Strategy								LEE Parameters (Scale 1=worst to 5=best)							
ID	Name	Goal Addressed	Description	Estimated Cost	Estimated Losses Due to Hazard	Percent of Hazard Mitigated	B/C Ratio	Social	Technical	Administrative	Political	Legal	Economic	Environmental	TOTAL
4.A.1	Firebreaks and Defensible Space	4.A	Remove vegetation and combustible material around buildings and critical infrastructure and provide firebreaks to prevent spread of fire in all 5 villages.	$500,000	$3,041,000	80.00%	4.87	4	4	4	3	5	5	3	28
4.A.2	Juniper Village Wildfire Protection Project	4.A	Fire protection treatment will cover 700 acres over a three-year period. This represents a significant reduction in fuel loads around the village of Juniper. Treatments will extend into the fire tracks of the total hazardous acreage.	$126,059	$3,041,000	20.00%	4.82	4	4	4	3	5	5	3	28
4.A.2	Kaibab Community Fire Protection and Recovery Project	4.A	A feasibility study for native plant re-vegetation program in catastrophic fire and post-fire prevention treatment sites for the purpose of maintaining limited fuel biomass and thus preventing the likelihood of wildfires.	$156,795	$3,041,000	20.00%	3.88	4	4	4	3	5	5	3	28
2.A.1	Kaibab Village Flood Control Program	2.A	Kaibab Village: Propose a flood control program that will contain/divert flash flood water away from homes, buildings and other structures.	$375,000	$415,000	100.00%	1.11	5	3	3	5	5	5	3	29
4.C.1	Wildfire Study	4.C	Develop a complete wildfire study to cover the reservation.	$85,000	$3,041,000	N/A	1.00	5	4	5	5	5	4	5	33
2.A.3	Kaibab Flood Study	2.A	Prepare a flood study for Kaibab Village to determine flood areas and mitigation strategies.	$75,000	$415,000	N/A	1.00	5	3	4	5	5	3	5	30
1.B.1	Wind Damage Protection Plan	1.B	Prepare assessment to identify building structures and methods to reduce possible wind damage	$30,000	N/A	N/A	1.00	5	5	4	5	5	5	5	34
1.B.1	Roofing Project	1.B	Upgrading existing structures to meet building codes.	$790,000	N/A	80.00%	1.00	5	4	4	4	5	5	5	32
3.A.1	Water Conservation Program	3.A	Determine current and projected water needs and guidelines for water conservation and outreach	$30,000	N/A	20.00%	1.00	3	4	4	3	5	5	5	29
5. A.1	Adopting Earthquake Standard Feasibility Study	5.A	Determine the feasibility of adopting additional standards for earthquake protection through building requirements.	$30,000	N/A	N/A	1.00	5	4	4	5	5	4	5	32
6.A.1	Natural/Man-Made Hazard Public Awareness Program	6.A	Develop public awareness program to inform the public concerning hazards and mitigation activities.	$225,000	N/A	N/A	1.00	4	5	4	5	5	4	5	32
7.B.1	Siren Sound Study	7.B	Determine the feasibility of a siren warning system for the five villages for emergency notifications.	$50,000	N/A	N/A	1.00	4	3	4	4	5	4	5	29
8.A.1	Alternate Transportation Corridor Study	8.A	Identify alternate all-season roads for each village and determine necessary upgrades to improve mobility within tribal reservation.	$50,000	N/A	N/A	1.00	5	5	4	4	5	4	5	32

Action/Project Implementation Strategies

Mitigation Strategy		Implementation Strategy			
~~ID~~	Name	Lead Agency	Funding Source	Completion Date	~~Critical Interim or Pilot Activities~~
4.A.2	Kaibab Community Fire Protection and Recovery Project	Kaibab Paiute Parks and Wildlife	Kaibab Paiute Tribal Council; Ecological Restoration Institute at Northern AZ University; Zion National Park; US Forest Service	Spring 2010	Continue collaborative effort with key agencies.
2.A.1	Kaibab Village Flood Control Program	Tribal PDW, Mohave County Roads Department, Bureau of Indian Affairs	Bureau of Indian Affairs; Dept of Housing and Urban Development; Dept of Homeland Security - Flood Mitigation Assistance Program, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program; Dept of Agriculture - Watershed Protection and Flood Prevention; County and State funding programs.	Fall 2015	Kaibab Flood Study
4.C.1	Wildfire Study	Tribal Emergency Response Commission(TERC)	Bureau of Indian Affairs Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program	Fall 2009	Acquire topographic and aerial photo quads.
2.A.3	Kaibab Flood Study	Tribal PDW	Bureau of Indian Affairs; Dept of Housing and Urban Development; Dept of Homeland Security - Flood Mitigation Assistance Program, Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program; Dept of Agriculture - Watershed Protection and Flood Prevention; County and State funding programs.	Fall 2009	Obtain topographic mapping for area. Identify cost-sharing partners.
1.B.1	Wind Damage Protection Plan	Tribal Facility Maintenance	HUD, BIA, Indian Housing Assistance, Housing Improvement Program, HOME Investments Partnerships Program	Fall 2009	Identify cost-sharing partners. Inform the public on intent of study.
1.B.1	Roofing Project	Tribal Housing and Facility Maintenance	HUD, BIA, Indian Housing Assistance, Housing Improvement Program, HOME Investments Partnerships Program	Fall 2015	Wind Damage Protection Plan
3.A.1	Water Conservation Program	Tribal Water Resources and Environmental	USEPA, US Dept of Interior, USGS, Dept of Defense; US Dept of Agriculture-National Resources Conservation Service	Fall 2009	Acquire water audits.S12
5. A.1	Adopting Earthquake Standard Feasibility Study	Housing and Facility Maintenance, TERC	Dept of Interior: National Earthquake Hazard Reduction Program; FEMA	Fall 2009	Review existing earthquake requirements.

6.A.1	Natural/Man-Made Hazard Public Awareness Program	Tribal Emergency Response Commission	FEMA, USDA, HUD, Homeland Security	Fall 2008	Identify cost-sharing partners.
7.B.1	Siren Sound Study	Facilities Maintenance and Housing Department	Dept of Interior; Homeland Security; FEMA	Fall 2009	Obtain map information for villages.
8.A.1	Alternate Transportation Corridor Study	Tribal Roads Department	US Dept of Transportation	Spring 2010	Obtain map information.
9.C.1	Document Preservation Program	Tribal Administration	Rural Utilities Service, FEMA	Fall 2010	Identify critical documents by department.

SECTION 6: PLAN MAINTENANCE

Requirement: 201.7(c)(4)(i): The plan maintenance process shall include a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan.

Requirement: 201.7(c)(4)(ii), (c)(4)(v): The plan maintenance process shall include a system for monitoring implementation of mitigation measures and project closeouts; and a system for reviewing progress on achieving goals as well as activities and projects outlined in the mitigation strategy.

According to the DMA2K requirements, each plan must define and document processes or mechanisms for maintaining and updating the hazard mitigation plan within the established three-year planning cycle. Elements of this plan maintenance section include:

The Tribe recognizes that this hazard mitigation plan is intended to be a "living" document with regularly scheduled monitoring, evaluation, and updating. The following sections present the Tribe's plan maintenance procedures for the next three years.

The responsibility for ensuring that the plan maintenance and update procedures are performed at the scheduled intervals shall come under the auspices of the Points of Contact listed in Section 2 or another person designated by the Tribal Board. The TPT shall also be convened, as needed, to perform the annual maintenance review and documentation.

5.2 Monitoring and Evaluation

The Plan shall be reviewed by the Planning Team in its entirety on at least an annual basis or following a major disaster. A brief memorandum documenting the review findings shall be prepared and included in Appendix G. Each review shall include an evaluation of the following:

- ***Recent Development*** – Recent development activities including the construction of new housing, commercial/industrial facilities, roads, major utilities, etc., shall be summarized or documented as they pertain to elements of the Plan.
- ***Risk Assessment*** – The identified hazards and associated risks shall be evaluated with respect to the previous year's events, and any significant differences shall be noted for either immediate revision or possible revision during the next planning cycle.
- ***Mitigation Strategy*** – The proposed A/Ps shall be reviewed and updated regarding status and implementation (See Section 5.2). Any changes shall be noted along with the successes and/or challenges associated with the implementation.

Important correspondence regarding multi-hazard mitigation shall also be archived in Appendix G for future incorporation into the plan at the three year update. Potential items may include phone logs, meeting minutes, site visit notes, letters, memorandums, and/or other important materials.

A summary of the review shall also be presented as an informational item to the Tribal Board on an at least an annual basis.

5.3 Mitigation Strategy Progress Assessment

The hazard mitigation goals and objectives identified by the Tribe and summarized in Section 4.2 of this plan, will be reviewed on at least an annual basis to assess the level of achievement in attaining those goals. Unless otherwise directed or warranted, the goals and objectives

review will coincide with the annual overall plan review and update schedule. Goals will be assessed using a subjective approach and a summary of the assessment will be included in the annual review memorandum.

Once an action/project is implemented, the A/P progress will be monitored by the Planning Team on at least an annual basis. For FEMA supported projects, progress reports will be required on a quarterly basis throughout the project duration. The degree of quarterly reporting will be dependent upon the type of A/P, its funding source, and the associated requirements. At a minimum, the quarterly report shall address:

- ✓ Project Completion Status
- ✓ Project Challenges/Issues (If any)
- ✓ Budgetary Considerations (Cost Overruns or Underruns)
- ✓ Detailed Documentation of Expenditures

Upon completion of projects, a member of the Planning Team will visit the project location to view the final results. A closed project will also change status to "Completed" and will then be monitored for effectiveness in the intended mitigation. FEMA supported project closeouts will include an audit of the A/P financials as well as other guidelines/requirements set forth under the funding or grant rules, and any attendant administrative plans developed by the Tribe.

5.4 Plan Update

According to DMA2K, the Plan will require updating and re-approval from FEMA every five years. The plan update will adhere to the set schedule using the following procedure:

- Six months prior to the plan expiration date, the Planning Team will convene to review and assess the materials accumulated in Appendix G.
- The Planning Team will update and/or revise the appropriate or affected portions of the plan and reproduce the plan document.
- The revised plan document will be presented before the Tribal Board for an official concurrence/adoption of the changes via a Tribal resolution.
- The revised plan will be submitted to FEMA for review, comment and approval.

5.5 Plan Implementation

The Plan will function as a stand-alone document subject to its own review and revision schedule presented in this section. The Plan will also serve as a reference for other mitigation planning needs of the Reservation. Many of the elements and mitigation strategies presented in this plan will either directly or indirectly impact other planning and mitigation activities within the Reservation. Whenever possible, the Reservation will endeavor to incorporate mitigation actions and projects identified in the Plan into existing Reservation planning mechanisms. At a minimum, the Plan will be reviewed and referenced with any revisions or updates to the planning documents summarized, as appropriate. This process may include adding or revising building codes, adding or changing zoning and subdivision ordinances, incorporating mitigation goals and strategies into comprehensive plans, and incorporating the risk assessment results into development review processes to ensure proper hazard mitigation for future development. In addition, an implementation strategy outlining

assignments of responsibility and completion schedules for specific actions/projects proposed in this plan are also included.

5.6 Continued Public Involvement

Requirement: 201.7(c)(4)(iv): The plan maintenance process shall include a discussion on how the Indian Tribal government will continue public participation in the plan maintenance process.

Kaibab Paiute is committed to keeping the public informed about the Reservation's hazard mitigation planning efforts, actions and projects. In order to accomplish this, the Tribal planning team shall pursue the following opportunities for public involvement and dissemination of information whenever possible and appropriate:

- Provide periodic summary updates of hazard mitigation A/P measures being implemented using newsletters and website.
- Conduct an annual presentation of hazard mitigation planning discoveries, progress, or proposed A/P measures at the Tribal Council Meetings.
- Participate in annual events such as the Annual Meeting held in October and other public events.

Perform public outreach and mitigation training meetings for targeted populations known to be in high risk hazard areas (i.e. – floodplain residents). The Tribe holds monthly Tribal Emergency Response Committee meetings where the plan will be discussed should any changes and/or updates need to be made. Tribal members not living within reservation boundaries are reached through a Tribal newsletter called "Smoke Signals," and any information regarding the plan, opportunities for the public to view the plan, and any other information regarding the plan can be passed along through the newsletter. A newsletter is also created by the Bioterrorism Department and can include any pertinent information to community members living within the reservation boundaries.

The plan will be made available for viewing by Tribal members through the Bioterrorism Office and the Administration Office.

SECTION 7: PLAN TOOLS

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Definitions

Actions: Specific actions that help achieve goals and objectives. Multiple mitigation actions may be defined to feed into an evaluation of the alternative actions.

Asset: Any natural or human-made feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Building: A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Building / Structure Collapse: The failure and downfall of a structure. The collapse may result from a variety of natural causes such as hurricanes, earthquakes, tornadoes, floods, or from manmade circumstances such as construction deficiencies, neglect, aging infrastructure, or acts of terrorism.

Consequences: The damages (full or partial), injuries, and losses of life, property, environment, and business that can be quantified by some unit of measure, often in economic or financial terms.

Critical Facilities and Infrastructure: Systems or facilities whose incapacity or destruction would have a debilitating impact on the defense or economic security of the nation. The Critical Infrastructure Assurance Office (CIAO) defines eight categories of critical infrastructure, see 'Assessing Vulnerability' for details.

Dam Failure: Can be caused by natural occurrences such as floods, rock slides, earthquakes, or the deterioration of the foundation or the materials used in construction. Usually the changes are slow and

not readily discovered by visual examination. Such a failure presents a significant potential for a disaster in that significant loss of life and property would be expected in addition to the possible loss of power and water resources.

Department of Homeland Security (DHS): Following the September 11, 2001 terrorist attacks, President George W. Bush created a new federal government department in order to bring 22 previously separate domestic agencies together. The new department's first priority is protecting the nation against further terrorist attacks. Component agencies analyze threats and intelligence, guard borders and airports, protect critical infrastructure, and coordinate the response for future emergencies. The new department is organized into five major directorates: Border and Transportation Security (BTS); Emergency Preparedness and Response (EPR); Science and Technology (S&T); and Information Analysis and Infrastructure Protection (IAIP); Management. In addition, several other critical agencies have been folded into the new department or are newly created. The FEMA is the foundation of the (EPR) Directorate.

Disaster Mitigation Act of 2000 (DMA2K): A law signed by the President on October 30, 2000 that encourages and rewards local and state pre-disaster planning, promotes sustainability as a strategy for disaster resistance, and is intended to integrate state and local planning with the aim of strengthening statewide mitigation planning.

Drought: Occurs when water supplies cannot meet established demands. "Severe" to "extreme" drought conditions endanger livestock and crops, significantly reduce surface and ground water supplies, increase the potential risk for wildland fires, increase the potential for dust storms, and cause significant economic loss. Humid areas are more vulnerable than arid areas. Drought may not be constant or predictable and does not begin or end on any schedule. Short term droughts are less common due to the reliance on irrigation water in arid environments.

Dust / Sand Storms: A dust or sand storm is a severe windstorm that sweeps clouds of dust across an arid region. They can be hazardous to transportation and navigation and to human health. Severe or prolonged dust and sand storms can result in disasters causing extensive economic damage over a wide area and personal injury and death. In Arizona, dust or sand storms are generally associated with the advance of a thunderstorm.

Earthquake: A naturally-induced shaking of the ground, caused by the fracture and sliding of rock within the Earth's crust. The magnitude is determined by the dimensions of the rupturing fracture (fault) and the amount of displacement that takes place. The larger the fault surface and displacement, the greater the energy. In addition to deforming the rock near the fault, this energy produces the shaking and a variety of seismic waves that radiate throughout the Earth. Earthquake magnitude is measured using the Richter Scale and earthquake intensity is measured using the Modified Mercalli Intensity Scale.

Emergency Preparedness and Response (EPR) Directorate: One of five major Department of Homeland Security Directorates which builds upon the formerly independent Federal Emergency Management Agency FEMA. EPR is responsible for preparing for natural and man-made disasters through a comprehensive, risk-based emergency management program of preparedness, prevention, response, and recovery. This work incorporates the concept of disaster-resistant communities, including providing federal support for local governments that promote structures and communities that reduce the chances of being hit by disasters.

Emergency Response Plan: A document that contains information on the actions that may be taken by a governmental jurisdiction to protect people and property before, during, and after a disaster.

Exposure: The number, types, qualities, or monetary values of various types of property or infrastructure and life that may be subject to an undesirable or injurious hazard event.

Extreme Heat: A combination of very high temperatures and exceptionally humid conditions that exceed regionally based indices for perceived risk.

Federal Emergency Management Agency (FEMA): Formerly independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery. As of March 2003, FEMA is a part of the Department of Homeland Security's Emergency Preparedness and Response (EPR) Directorate.

Fissure: Earth fissures are cracks at or near the earth's surface resulting from differential land subsidence. Differential land subsidence occurs when adjacent areas subside at different rates. More subsidence occurs where the bedrock is deeper. The area of differential land subsidence is where enough tension may build to crack the earth and form a fissure. Fissures begin as small cracks and erosion causes them to grow and expand.

Flooding/Flash Flooding: Flooding is an overflowing of water onto normally dry land and is one of the most significant and costly of natural disasters. Flash flooding is caused by too much rain fall in a small area for a short period of time. Several factors contributing to flash flooding such as: rainfall intensity and duration, topography, soil conditions and ground cover. They are normally caused by slow-moving thunderstorms or thunderstorms repeatedly moving over the same the same area that occur within a few minutes or hours of excessive rainfall or a quick release from a dam failure.

Flood Insurance Rate (FIRM): of a community, prepared by FEMA, that shows the special flood hazard areas and the risk premium zones applicable to the community.

Flood Mitigation Assistance (FMA) Program: FEMA grant program that provides funds on an annual basis so measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the NFIP.

Frequency: A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1% chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered. Probability is a related term.

Fujita Scale of Tornado Intensity: Rates tornadoes with numeric values from F0 to F5 based on tornado winds peed and damage sustained. An F0 indicates minimal damage such as broken tree limbs or signs, while an F5 indicates severe damage sustained.

Geographic Information Systems (GIS): A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.

Goals: General guidelines that explain what you want to achieve. Goals are usually broad statements with long-term perspective.

Hazard: A source of potential danger or adverse condition. Hazards include both natural and man-made events. A natural event is a hazard when it has the potential to harm people or property and may include events such as floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. Man-made hazard events originate from human activity and may include technological hazards and terrorism. Technological hazards arise from human activities and are assumed to be accidental and/or have unintended consequences (e.g., manufacture, storage and use of hazardous materials).

Hazard Event: A specific occurrence of a particular type of hazard.

Hazard Identification: The process of identifying hazards that threaten a specific area.

Hazardous Materials Incidents: A spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment of a hazardous material, but excludes: (1) any release which results in exposure to poisons solely within the workplace, with respect to claims which such persons may assert against the employer of such persons; (2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine; (3) release of source, byproduct, or special nuclear material from a nuclear incident; and (4) the normal application of fertilizer.

Hazard Mitigation: Cost effective measures taken to reduce or eliminate long-term risk associated with hazards and their effects.

Hazard Mitigation Assistance (HMA): FEMA grant programs that enable mitigation measures to be implemented before, during and after the recovery from a disaster. These programs are: Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and Flood Mitigation Assistance (FMA).

Hazard Mitigation Grant Program (HMGP): FEMA grant program that assists in implementing long-term hazard mitigation measures following major disaster declarations.

Hazard Profile: A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent.

HAZUS: A GIS-based nationally standardized Flood, Earthquake and Hurricane loss estimation tool developed by FEMA.

Implementation Strategy: A comprehensive strategy that describes how the mitigation actions will be implemented.

Landslides / Mudslides: Landslides, like avalanches are massive downward and outward movements of slope-forming materials. The term landslide is restricted to movement of rock and soil and includes a broad range of velocities. Slow movements, although rarely a threat to life, can destroy buildings or break buried utility lines. A landslide occurs when a portion of a hill slope becomes too weak to support its own weight. The weakness is generally initiated when rainfall or some other source of water increases the water content of the slope, reducing the shear strength of the materials. A mud slide is a type of landslide referred to as a flow. Flows are landslides that behave like fluids: mud flows involve wet mud and debris.

Levee Failure: A levee failure/breach results when a portion of the levee breaks away, providing an opening for water to flood the landward side of the structure. Such breaches can be caused by surface erosion due to water velocities.

Liquefaction: The phenomenon that occurs when ground shaking (earthquake) causes loose soils to lose strength and act like viscous fluid. Liquefaction causes two types of ground failure: lateral spread and loss of bearing strength.

Mitigate: To cause to become less harsh or hostile; to make less severe or painful. Mitigation activities are actions taken to eliminate or reduce the probability of the event, or reduce its severity of consequences, either prior to or following a disaster/emergency.

Mitigation Plan: A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in a defined geographic area, including a description of actions to minimize future vulnerability to hazards.

Modified Mercalli Intensity Scale: A commonly used in the United States by seismologists seeking information on the severity of earthquake effects. Intensity ratings are expressed as Roman numerals between I at the low end and XII at the high end. The Intensity Scale differs from the Richter Magnitude Scale in that the effects of any one earthquake vary greatly from place to place, so there may be many Intensity values (e.g.: IV, VII) measured from one earthquake. Each earthquake, on the other hand, should have just one Magnitude, although the several methods of estimating it will yield slightly different values (e.g.: 6.1, 6.3).

Objectives: Defined strategies or implementation steps intended to attain the identified goals. Unlike goals, objectives are specific, measurable, and have a defined time horizon.

100-Hundred Year Floodplain: Also referred to as the Base Flood Elevation (BFE) and Special Flood Hazard Area (SFHA). An area within a floodplain having a 1% or greater chance of flood occurrence in any given year.

Planning: The act or process of making or carrying out plans; the establishment of goals, policies, and procedures for a social or economic unit.

Pre-Disaster Mitigation (PDM) Grant Program: FEMA program that provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects.

Probability: A measure of how often events of a particular magnitude are expected to occur. Probability describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1% chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered. Probability may also be measured in terms of the chance that an event will be exceeded (or not exceeded) over a specified period of time. Frequency is a related term.

Q3 Data: The Q3 Flood Data product is a digital representation of certain features of FEMA's Flood Insurance Rate (FIRM) product, intended for use with desktop mapping and Geographic Information Systems technology. The digital Q3 Flood Data are created by scanning the effective Flood Insurance Rate (FIRM) paper maps and digitizing selected features and lines. The digital Q3 Flood Data are designed to serve FEMA's needs for disaster response activities, National Flood Insurance Program activities, risk assessment, and floodplain management.

Repetitive Loss Property: A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than ten days apart) of at least $1,000 each have been paid within any 10-year period since 1978.

Richter Magnitude Scale: A logarithmic scale devised by seismologist C. F. Richter in 1935 to express the total amount of energy released by an earthquake. While the scale has no upper limit, values are typically between 1 and 9, and each increase of 1 represents a 32-fold increase in released energy.

Risk: The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage beyond a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Risk Assessment: A process or method for evaluating risk associated with a specific hazard and defined in terms of probability and frequency of occurrence, magnitude and severity, exposure, and consequences.

Severe Repetitive Loss Property: A residential property that has at least four NFIP claim payments over $5,000 each, when at least two such claims have occurred within any ten-year period, and the cumulative amount of such claims payments exceeds $20,000; or for which at least two separate claims payments have been made with the cumulative amount of the building portion of such claims exceeding the value of the property, when two such claims have occurred within any ten-year period.

Severe Wind: For the purpose of this Plan, includes Thunderstorm/High Winds, Tornado/Dust Devils, and Tropical Storms/Hurricanes.

Substantial Damage: Damage of any origin sustained by a structure in a Special Flood Hazard Area whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50% of the market value of the structure before the damage.

Thunderstorms / High Winds: Violent storms typically associated with high winds, dust storms, heavy rainfall, hail, lightning strikes, and/or tornadoes. The unpredictability of thunderstorms, particularly their formation and the rapid movement to new locations heightens the possibility of floods. Thunderstorms, dust/sand storms and the like are most prevalent in Arizona during the monsoon season, which is a seasonal shift in the winds that causes an increase in humidity capable of fueling thunderstorms. The monsoon season in Arizona typically is from late-June or early-July through mid-September.

Tornadoes / Dust Devils: A violently rotating column of air extending from a thunderstorm to the ground. The most violent tornadoes are capable of tremendous destruction with wind speeds in excess of 250 mph. Damage paths can exceed a mile wide and 50 miles long. Tornadoes are one of nature's most violent storms. In an average year, 800 tornadoes are reported across the United States, resulting in 80 deaths and over 1,500 injuries. The damage from tornadoes is due to high winds. The Fujita Scale of Tornado Intensity measures tornado / high wind intensity and damage.

Dust devils are small but rapidly rotating columns of wind made visible by the dust, sand, and debris it picks up from the surface. They typically develop best on clear, dry, hot afternoons and are common during the summer months in the desert portions of Arizona. While resembling tornadoes, dust devils typically do not produce damage, although in Arizona they have done so occasionally.

Tropical Storms / Hurricane: A tropical system which the maximum sustained surface wind ranges from 34 to 63 knots (39 to 73 mph). Tropical storms are associated with heavy rain, high wind, and thunderstorms. High intensity rainfall in short periods is typical. A tropical storm is classified as a hurricane when its sustained winds reach or exceed 74 mph (64 knots). These storms are medium to large in size and are capable of producing dangerous winds, torrential rains, and flooding, all of which may result in tremendous property damage and loss of life, primarily in coastal populated areas. The effects are typically most dangerous before a hurricane makes landfall, when most damage occurs. However, Arizona has experienced a number of tropical storms that caused extensive flooding and wind damage.

Vulnerability: Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power–if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct effects.

Vulnerability Analysis: The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability analysis should address impacts of hazard events on the existing and future built environment.

Vulnerable Populations: Any segment of the population that is more vulnerable to the effects of hazards because of things such as lack of mobility, sensitivity to environmental factors, or physical abilities. These populations can include, but are not limited to, senior citizens and school children.

Wildfires: A rapid, persistent chemical reaction that releases heat and light, especially the exothermic combination of a combustible substance with oxygen. Wildfires present a significant potential for disaster in the southwest, a region of relatively high temperatures, low humidity, low precipitation, and during the spring moderately strong daytime winds. Combine these severe burning conditions with people or lightning and the stage is set for the occurrence of large, destructive wildfires.

Winter Storms: Cold wind accompanied by blowing snow; freezing rain or sleet, cold temperatures, and possibly low visibility and drifting snow. The storms often make roads impassable. Residents, travelers, and livestock may become isolated or stranded without adequate food, water, and fuel supplies. The conditions may overwhelm the capabilities of a local jurisdiction. Winter storms are considered deceptive killers as they indirectly cause transportation accidents, and injury and death resulting from exhaustion/overexertion, hypothermia and frostbite from wind chill, and asphyxiation.